THE IRON TRADE REVIEW

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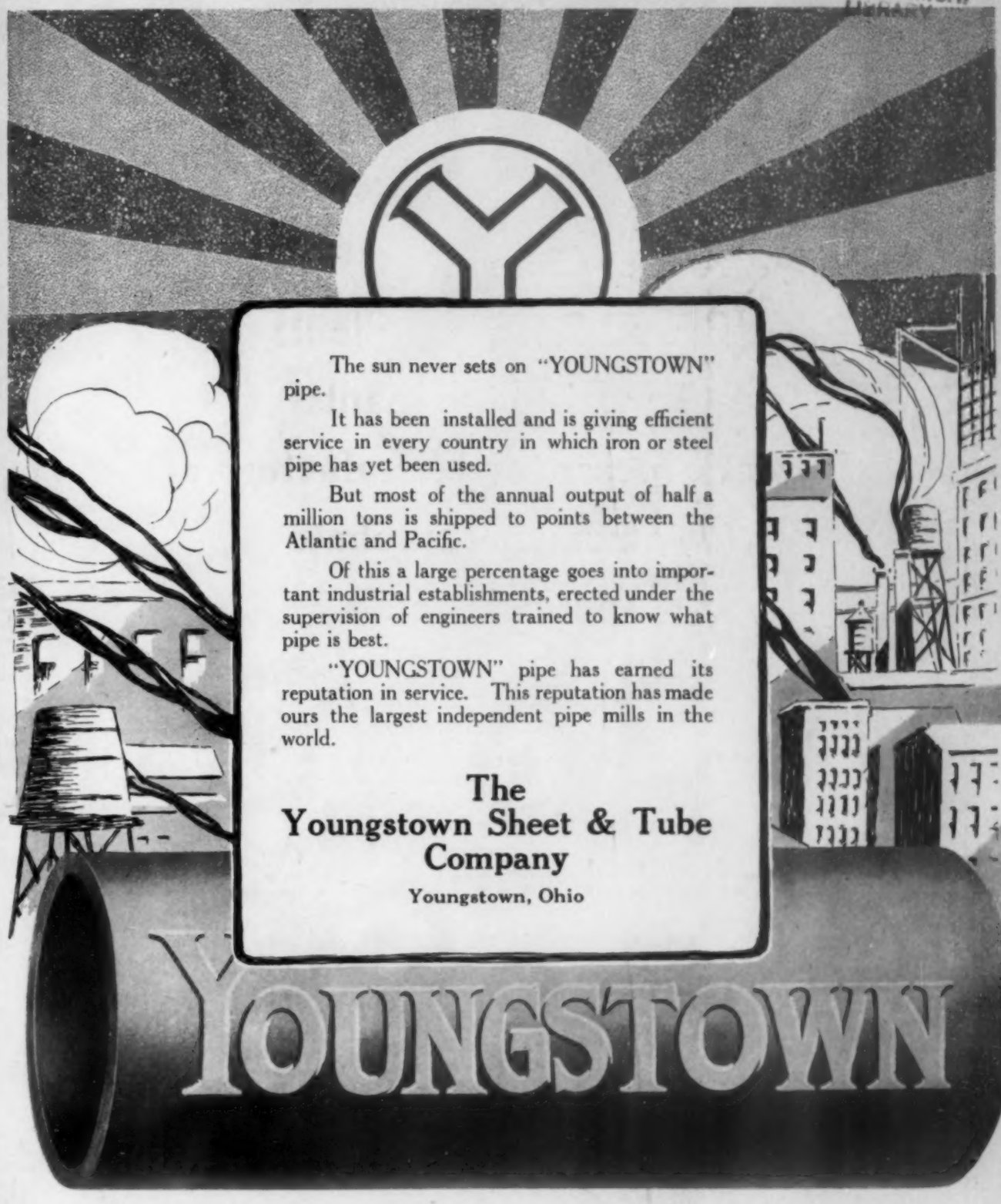
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THE IRON TRADE REVIEW

Vol. LIX · Cleveland, August 31, 1916 *No. 9*

Prosperity Reigns, Paralysis Feared

Blast Furnaces in Better Position Than Mills to Continue in Operation if Strike Comes—Heavy Buying of Pig Iron

PROSPERITY continues in the iron trade with no indication of preparation to meet the great railroad strike which is threatened. Little can be done now, and conditions must be met as they arise. It is known that many blast furnaces are well supplied with ore and coke and would be able to continue operation, but if there should be a general suspension of railroad operation, the closing down of finishing mills would be almost universal. The New Haven has already announced an embargo on all freight which cannot be delivered prior to the time set for the general strike next Monday. Other railroads, including the Pennsylvania, New York Central, Erie and Lackawanna, are expected to take similar action. Doubt is expressed as to whether the brotherhoods will have the enthusiastic support of the rank and file of workingmen throughout the country.

Steel bookings in August were much in excess of shipments and the mills now are trying to reduce this surplus. Buying of rails has been renewed and several round tonnages placed.

Iron Ore

The shipment of iron ore from the Lake Superior region continues at such a rapid rate that it will not be surprising if the total movement for this month amounts to 10,000,000 tons. A contract to move a small tonnage of ore has been made at $1.25 net from the head of the lakes, but $1 is the usual carrying charge for this year. Shippers express determination not to pay that amount next year.

Pig Iron

The buying of pig iron has broadened during the past week and while there is still much activity in steel-making grades, foundry irons have become much more active than they were a week ago. In the Philadelphia district, the selling of from 12,000 to 15,000 tons of basic at $19.50, delivered, was followed by sales at $19.75 to $20. At Pittsburgh, at least one sale of basic has been made at $18.50, valley. Buying of this grade includes about 25,000 tons by a Kokomo steel company. At Pittsburgh, inquiries for basic aggregate about 30,000 tons, mostly from the east. Sales of bessemer for expert have been large and considerable tonnage is still pending. Sales of foundry include a good-sized tonnage to a Detroit radiator company. The Westinghouse Electric & Mfg. Co. is in the market to cover for its Cleveland foundry. At Chicago, foundry iron is more active. The southern situation is improving, especially as to prices, which are considerably firmer.

Machine Tools

The machine tool market is strong and advances in prices by prominent makers are expected at an early date. In the east, there is a fairly active demand from domestic sources, the most important business pending being that of the Bethlehem Steel Co. and the General Electric Co. In Cincinnati, the English government has placed several good orders. Active inquiry for machine shop equipment and small capacity electric traveling cranes is reported in the Pittsburgh district.

Shapes and Plates

Although the plate market is very strong, an interesting feature has developed in the very active bidding on 6,000 tons for delivery at Los Angeles. Several companies, which have been selling at from 3.50c to 4c, are reported to have made rather large concessions for the Pacific coast business. Sales include 7,000 tons of plates for a ship yard at Seattle and several thousand tons for export to Japan. J. P. Morgan & Co. have placed an additional order for 10,000 tons of shapes for export. At least three more boats have been placed on the Pacific coast and four on the Atlantic. The Bethlehem Steel Co. has bought about 40,000 tons for various yards. A Chester yard has bought 7,500 tons. Most of this business is for the third quarter of next year, and it is impossible to get large tonnages earlier.

THE OPEN HEARTH

When Politics is Treason

AN EXCEEDINGLY grave situation confronts the country. In some respects, the strike of railroad employes, threatened to be inaugurated Sept. 4, would be worse than war with a great power. The situation is unfortunately complicated by the fact that this is a presidential year, and it is extremely difficult to obtain action free from partisan considerations. What the country demands is that there shall be no truckling to the unjust demands of labor nor granting of any unjust claim on the part of railroads. It also demands that the President act without regard to the possible effect on his political fortunes and that the opposition party in congress do its full duty, whether it helps or mars the success of the party at the November election. The man who subordinates his party to his country is a traitor.

The backbone of the Debs strike of 1894 on the railroads was broken by Grover Cleveland. The same stern devotion to duty and unflinching courage are needed now.

Cost of Steel in Buildings

THE contract price of steel shapes has advanced from $26 per ton to $52 per ton during the past year, and frequently in recent months higher prices have been paid for prompt delivery. Naturally there has been some tendency to delay or abandon the construction of buildings not imperatively needed, particularly structures of more or less speculative character. Hence it is interesting to inquire to what extent the increased cost of plain steel and of fabricating and erecting is responsible for the increased cost of new buildings.

A year ago, the office building of ordinary form of construction was being erected at from $62 to $65 per ton, while today the cost is from $85 to $90. This looks like a rather large percentage of increase, but of the total cost of a building of this type, the cost of the steel is only 12 to 15 per cent, although the cost of the steel in some store buildings is as high as 20 per cent. Taking this high percentage, 20, the cost of one-fifth of the total of all materials has increased about 45 per cent. It would seem from these figures that the increased cost of steel does not furnish much reason for postponing erection of any building that is expected to earn a fair percentage of its cost.

The use of concrete construction is being resorted to in some cases, but the tonnage of steel required for reinforcing in concrete buildings is fully half of that required in a strictly steel building. Hence the saving by the use of concrete is not very large. Another fact to be remembered is that the salvage of a concrete building is nothing. The history of buildings shows that very many, especially in large cities, are torn down in 25 years. In the razing of a building of steel construction, the salvage is at least equal to the cost of removing the building, but in the case of concrete buildings, nothing is saved, and the razing process is an extremely difficult one. Concrete has its uses, but as a substitute for steel, it is not making very rapid progress. In fact, it is a question whether it has not actually increased the tonnage of steel used in erecting buildings.

The Armor Plate Situation

DESPITE the unfriendly attitude of the navy department toward the manufacture of armor plate, it is not at all probable that the department will have anything but hearty co-operation in taking care of the orders which will result from the elaborate new construction plan which has just been adopted for the navy. The armor plate manufacturers are now doing their utmost to complete contracts in hand and will work their plants to the limit to meet the requirements of the government. Both patriotism and sound business policy would dictate that this should be done. When, however, the government comes to place contracts for vessels under the ship purchase act, which appropriates $50,000,000 for this purpose, the navy department will not find it an easy matter. Ship yards are filled with orders for many months and will not discommode themselves to carry out the provisions of the government purchase act, which is thoroughly obnoxious to ship builders for various reasons.

As to the proposed government armor plate plant, it is announced that Secretary Daniels will make an effort to purchase a private plant for the use of the government, but it does not seem at all likely that any of the companies will be willing to dispose of their armor plate works, which are integral parts of their plants and could not be satisfactorily operated by the government under such conditions. While Secretary Daniels is talking about various things that he may or may not do, numerous cities are clamoring to present their claims to be selected as the site for the proposed government plant. These cities would be wiser if they would entirely ignore this ill-advised project. Owing to the fight against efficiency which is being successfully carried on by the labor unions in congress, and for other reasons, the city which does not seek to have a government plant located within its limits is likely to be more prosperous and happier in the relations of employers and employes than the

THE OPEN HEARTH

city which invites the troubles that are likely to accompany government ownership.

Ore, Industries and War

THE great iron ore deposits of France are likely to be a very important factor in deciding when and how terms of peace shall be agreed upon by the European nations now at war. Soon after war was declared, *The Iron Trade Review* called attention to the vast importance of these deposits and published a map showing the location of the iron ore of France and iron and steel manufacturing plants in the district which was taken possession of by Germany early in the war. Later information which we have received is to the effect that while at first the Germans used ordinary mining methods and did not waste the ore, they recently have been mining hurriedly with little or no regard for conservation of the valuable deposits. However this may be, it is clear that Germany will hold on to the ore lands as long as possible and get as much out of them as it can.

Frank H. Simonds, one of the ablest writers on the war, in an article published Sunday, predicts that the present conflict will last four years from Aug. 1, 1914, and will end inside German frontiers. He shows very clearly that if peace is restored now, Germany would be the victor. He tells of the success of Germany in annexing the industrialized districts of France, Belgium and Poland and calls attention particularly to the great iron deposits of France still held by Germany. "France," he says, "means after the war to have her lost lands and no French statesman will now consider a peace which does not restore the Lorraine iron districts, Saar coal districts and the remarkable deposits of phosphate along the Vosges." Mr. Simonds adds:

"To put it baldly: In two years of war Germany has wrecked the factory and industrial machinery and plants of France and Belgium and of Russian Poland; she has very seriously crippled the shipping resources of her only considerable rival on the seas. In doing all this, she has been able to preserve her machinery intact and her commercial fleets have not suffered proportionately to the British. Now, if peace came tomorrow, her factories, her plants, her shipping, would be, with relation to world commerce, in a far better position than they were in August, 1914. Like all other great nations, she would have incurred a vast debt, but, while she had crippled their means of paying the debt, she would have preserved hers."

If the allies did not immediately perceive these important facts, they certainly do now and we believe they will not rest or sign any peace treaties until they have put their countries in such condition industrially that Germany will not have advantage in the commercial struggle which is bound to follow the present war.

Seeing the Other Fellow's Side

SHORTLY after the European war was declared, J. P. Morgan was quoted as saying that all nations would suffer on account of such a great catastrophe. For some months, it seemed as if Mr. Morgan's prediction would be fulfilled as to the United States, but in time, as business improved and a period of great prosperity was inaugurated, exactly the opposite apparently was true. Certainly as far as material profits have been concerned, the United States has benefited immensely, but for some time indications that the war will bring serious problems to this country have not been lacking. Evidence to this effect has been shown particularly among the wage earners, for in spite of unprecedentedly high wages of many men and women, there has been much discontent. James A. Emery, general counsel for the National Council for Industrial Defense, when asked recently why antagonism to business so constantly appears in our present-day legislation, said that the basic factors are envy, discontent and suspicions. Mr. Emery added:

"The extraordinary industrial growth of our nation since the civil war, the opening of new territory, the development of resources, the rapid increase in population—all these things have resulted in the creation of many big and sudden fortunes. Big and sudden fortunes not only inspire emulation, but also envy; they not only excite ambition, but also discontent. The wages of the average manual toiler, however high, are very naturally compared by him with the enormous rewards that go to the man who possesses and exercises those invisible qualities that contribute so greatly to the material development of our nation, but the nature and exercise of which are not so clear to the mass. And it is but natural for the manual toiler —which is the lot of the great body of our people— to feel, especially under the continuous flood of delusive doctrine poured into his ear, that somehow or other in the division of the products of industry he has become the victim."

This is an admirable statement and Mr. Emery might well have added that one effect of the great war has been to increase greatly the feelings of envy, discontent and suspicion. Some day there must come a readjustment of wages and the ordeal is likely to be a severe one. One shrinks from thinking of the trouble that it may cause. In order that the controversies that are bound to come may be as free from bitterness as possible, it behooves employers and employes alike to strive now more than ever before to be reasonable in their demands and to cultivate the practice of putting oneself in the other fellow's place.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products August 30, average for July, 1916, average for May, 1916, and average for August, 1915. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Aug. 30, 1916.	Aver. for July, 1916.	Average for May, 1916.	Aver. for Aug., 1915.
Bessemer pig iron, Pittsburgh	$21.95	$21.95	$21.95	$15.89
Basic pig iron, Pittsburgh	18.95	18.95	18.95	14.89
No. 2 Fdy. pig iron, Pittsburgh	19.45	19.45	19.325	14.70
Northern No. 2 Fdy., Chgo.	19.00	19.00	19.00	13.40
Lake Superior Charcoal, Chgo.	19.75	19.75	19.75	15.75
Mall. Bess., Chgo.	19.50	19.50	19.50	13.40
Southern No. 2, Birmingham	13.50	14.00	14.95	11.00
Southern Ohio No. 2, Ironton	18.00	18.38	18.46	13.63
Basic, eastern Pa.	19.75	19.25	20.50	15.25
No. 2X Virginia furnace	18.50	18.50	18.50	13.00
No. 2X foundry, Philadelphia	19.75	20.00	20.75	15.25
Ferro mang., Balti.	170.00	175.00	175.00	105.00
Bessemer billets, Pbgh.	45.00	40.00	44.25	23.00
Bess. sheet bars, Pbgh.	45.00	40.00	44.25	24.00
Op.-h'th sh. bars, Pbgh.	45.00	40.00	44.25	25.00
Open-hearth billets, Pbgh.	45.00	40.00	44.25	24.00
Steel bars, Chgo.	3.10	2.69	2.69	1.49
Steel bars, Pittsburgh, contr.	2.60	2.50	2.50	1.30
Iron bars, Philadelphia	2.559	2.559	2.559	1.40
Iron bars, Cleveland, local del'y.	2.40	2.40	2.40	1.22
Iron bars, Chgo. mill	$2.35	$2.35	$2.35	$1.23
Beams, Chgo.	3.10	2.69	2.69	1.49
Beams, Pittsburgh, contr.	2.60	2.50	2.50	1.30
Beams, Philadelphia	2.759	2.659	2.659	1.45
Tank plates, Pbgh., contract	3.00	2.86	2.75	1.30
Tank plates, Chicago	3.50	3.09	3.09	1.44
Tank plates, Philadelphia	3.909	3.909	3.909	1.45
Sheets, blk., No. 28, Pbgh.	2.90	2.90	2.925	1.83
Sheets, blue an., No. 10, Pbgh.	3.00	3.00	3.02	1.36
Sheets, galv., No. 28, Pbgh.	4.15	4.37	4.88	3.93
Wire nails, Pittsburgh	2.60	2.50	2.50	1.61
Connellsville fur. coke, contr.	2.40	2.42	2.60	1.75
Connellsville fdy. coke, contr.	3.15	3.15	3.50	2.25
Heavy melting steel, Pbgh.	16.00	16.25	17.125	13.38
Heavy melting steel, east'n Pa.	15.00	15.25	17.00	13.50
Heavy melting steel, Chgo.	15.00	14.15	16.50	11.50
No. 1 wrought eastern Pa.	20.00	19.75	22.75	15.00
No. 1 wrought, Chgo.	16.00	14.00	16.35	10.12
Rerolling rails, Chgo.	16.25	15.70	17.25	11.75
Car wheels, Chgo.	12.00	12.25	13.15	11.40

(For Additional Prices See Page 442.)

More General Activity in Pig Iron

More Life in Foundry and Malleable Markets With Fair Inquiry in Steel Making Grades—Price Tendency is Upward

Buffalo, Aug. 29.—Furnaces of the Buffalo district in the past week have booked orders for fully 100,000 tons and over of foundry, malleable, Bessemer and basic grades of pig iron, making a total for the two-weeks period of the buying movement that began in mid-August, of over 150,000 tons. The heavy placement has materially stiffened the market and the range of prices is now more nearly $19 to $20 than the price of $18.50 to $19.50 previously quoted. One large producing interest has established an absolute minimum of $19 for No. 2X.

The buying on the part of melters has been to cover their needs for what available tonnages may be secured for delivery over the remainder of 1916 and for first half of 1917. While the booking aggregates a large total it represents for the most part the buying on the part of a limited number of large users, rather than the entrance into the market of the general run of melters.

The furnaces are now sold up solid for months ahead for every ton of iron they are able to produce and in the face of this situation the majority of the consumers are not, as yet covered for their needs, and particularly so for first and second quarter of the new year. It was previously reported from here that in this respect the market had barely been scratched. The added heavy placement has amounted to but a little more scratching.

Reports from all parts of the territory served by the stacks of the Buffalo district indicate that foundries everywhere are busy to the limit of their ability to get out their products and the limitations are matters of strikes or inability to get sufficient labor. Foundries on the average, on account of the labor situation, are operating to about 65 per cent of their capacity.

This average was determined by a large melter of the territory, who, being behind on account of labor trouble and shortage, made a thorough canvass of other foundries to take on subcontracts the work to be done and found that the melters were working generally on the percentage indicated.

Demand is Increasing

Philadelphia, Aug. 28.—Demand for pig iron, both from domestic and foreign sources, continues of increasing proportions. Consumers in this territory, now that the fourth quarter is but one month away, are inquiring both for that delivery and for the first quarter, and, in some cases, the first half of next year. A comparatively large amount of business was entered last week; this embraced large tonnages of basic and low phosphorus, and considerable malleable, and as a result the market on these grades is pretty well sold up. At least two eastern Pennsylvania makers are sold out of basic for the remainder of the year, while a maker of low phosphorus iron also has disposed of this year's entire output. The week's business led to further advances in the price of basic, and an advance in the price of low phosphorus. The market on other grades, although the makers are talking higher prices, has not yet shared the advances.

Fully 12,000 to 15,000 tons of basic last week were sold to consumers in this territory at $19.50, delivered. Subsequently sales were made at $19.75, and the market now may be quoted at $19.75 to $20, delivered eastern Pennsylvania, for the remainder of the year. Among new inquiries for basic are two which involve, together, approximately 30,000 tons, one from a consumer in this territory and another from a consumer in New York territory. It is understood a steel foundry in this territory which recently inquired for from 18,000 to 20,000 tons of basic, either has closed or is about to close for this tonnage.

Additional large sales of bessemer iron were made for export last week; these were done on the basis of $21

(*For complete prices see page 442.*)

to $21.25, valley. A shipment of 4,000 tons left Philadelphia last week for Italy. Considerable activity, as previously stated, featured low phosphorus. Several good-sized tonnages for delivery over the remainder of the year were sold to consumers in this territory. Some moderate sales were made to Canada and further tonnages for that country are being negotiated. Low phosphorus iron now is quoted at $31 to $32, furnace, depending on quality. A lot of 1,000 tons of low phosphorus iron will be exported from this port this week, it is reported.

Demand for foundry iron is increasing, but is not active. A large cast iron pipe maker put out an inquiry for 5,000 tons of No. 3 and gray forge iron for delivery during the remainder of the year. Other pipe companies bought in a small way. Prices on foundry iron are practically unchanged. Northern No. 2X continues to be quoted at $19.50 to $20, delivered Philadelphia. A number of sales of Virginia iron were reported; prices on Virginia iron remain unchanged.

Basic Sold at $18.50

Pittsburgh, Aug. 29.—The unusual activity in the pig iron market in the Pittsburgh district which developed during last week, seems to have subsided to a slight degree and although the early part of this week witnessed encouraging inquiries for all grades, there was not the volume of business noted several days previous.

Although prices for the various grades of iron continue to be quoted at the former figures, there is a strong tendency for advances, particularly in basic and foundry grades. It is understood that a number of dealers are holding their basic iron at $18.50, valley, and some tonnages have been sold at this figure. Several dealers in foundry iron are demanding $19 for their product. There seems to be a feeling among operators in this district that the differential between basic and bessemer, which now amounts to $3, will eventually be reduced as low as $1. How soon this change will be made, is a matter of conjecture, as no one feels competent to predict what the future of the market may bring forth.

During the past week, numerous inquiries for basic have been reported. Many of these originated in the Pittsburgh district, while inquiries for approximately 30,000 tons came from the east, where operators attracted by the price of bessemer for export had placed their furnaces on that product and were buying basic for their own needs.

Considerable activity in foundry grades was noticed during the week. One large sale involving 10,000 tons to a Pittsburgh consumer was reported. The Westinghouse Air Brake Co. bought approximately 5,000 tons of No. 2 foundry iron and the Westinghouse Electric & Mfg. Co. is in the market for iron for first and second quarter for its Cleveland plant.

More Active Foundry Inquiry

Chicago, Aug. 29.—Consumers of foundry iron are inquiring more actively for both northern and southern iron than has been the case for several weeks. Malleable users are not interested in the market at present. The recent flurry on basic iron, which resulted in considerable sales to users in the St. Louis district, and brought out some concessions on account of local competition, has not been continued and there is now no inquiry for basic iron.

Most activity is for first half delivery, although some business is being placed for fourth quarter of this year. Some fourth quarter production by Chicago furnaces has not yet been contracted, but at the present rate of buying this probably will be taken care of. Northern No. 2 foundry and malleable are strong at $19 and $19.50, Chicago furnace. Some high phosphorus irons from northern furnaces are being sold on a basis to meet southern competition in the local field and at competitive points.

Southern prices apparently are much firmer than was the case a few weeks ago. A Tennessee stack, which was willing to take contracts at $13.50, Birmingham, up to two weeks ago, is now asking $14.50, Birmingham, and requires all orders to be submitted before being confirmed. It appears that some southern iron can be obtained at $14, Birmingham, for last half, and $14.50 for first half, but almost all furnaces are asking 50 cents per ton higher than these prices.

One producer in the Ironton district is still taking tonnage at $18, Ironton, but states that with a small additional tonnage on his books he will advance his quotation to $19. Charcoal iron is selling well and considerable tonnages have been placed within the past few days at the range of quotations which has been pegged for several months.

Bessemer iron for export continues to be a feature of the southern market and while no contracts have been closed recently for this grade, several inquiries are now being considered, one being for 20,000 tons and others for smaller tonnages.

Prices of northern iron seem likely to be advanced before long, as every condition points to a strong market. While present quotations have not advanced for several months, it must be borne in mind that the Chicago market has been subjected to strong competition by lower-priced southern iron on the one hand and Lake Superior charcoal iron on the other. That these influences have been resisted successfully, shows the strength of the situation.

Many Are Buying

Cleveland, Aug. 29.—The pig iron market in the immediate Cleveland district is very quiet, but firms having furnaces in other districts report a very gratifying demand, especially for foundry grades. The only inquiry of importance in the Cleveland district is from the Westinghouse Electric & Mfg. Co., for a tonnage not stated for delivery during the first and second quarters of next year. As about 6,000 tons are usually bought by this company for a half year, it is expected that an order for that tonnage will be placed. Reports from Marion, Bucyrus and other points in central Ohio indicate considerable activity in foundry grades. Furnaces at Toledo, Detroit and Erie are also receiving numerous inquiries. On the whole, the pig iron situation shows considerable increase in strength.

St. Louis Market Active

St. Louis, Aug. 28.—An inquiry for 6,000 tons of malleable iron that made its appearance today for delivery over the first half of next year, is the best thing in the market. There also is an inquiry out for 500 tons of northern iron, and several for car lots of northern and southern grades. Southern iron is quoted at $14 to $14.50, and northern at $19, Chicago. A sale of 1,000 tons of northern iron for first half delivery was made the latter part of last week.

South Gets Its Share

Birmingham, Ala., Aug. 29.—The Birmingham district, within the past week, has participated in its share of the buying movement, which seems to be well under way. Between 20,000 and 30,000 tons of pig iron were sold during the week, and there are outstanding quotations on 10,000 to 15,000 tons. One interest reports the sale of 9,500 tons—about 2,000 tons for delivery through first quarter of 1917—another company, 8,000 tons, still another 2,000 tons for foreign delivery, and more than 8,000 tons by two other concerns. The prices obtained were $14.50 to $15 per per ton at the furnace for prompt and rest of the year, and as much as $16.50 per ton for special analysis iron of low silicon content. During the week, another large capacity furnace was taken off foundry iron and put on basic, orders for the

(*For complete prices see page* 442.)

entire output of the furnace having been received for the rest of the year. The Republic company has decided to blow out one of its Thomas furnaces for relining and general repairs, which will be out for the remainder of the year. The elimination of these two stacks as producers of foundry iron for the year, means the reduction in output of foundry iron of about 20,000 tons per month. The heads of the various pig iron companies look upon the present buying movement as a forerunner of a very substantial one within the next 60 days, and they are exceedingly hopeful of the firm establishment of at least $15 to $15.50 market by that time.

New York Market Brisk

New York, Aug. 29.—The eastern pig iron market continues to swing along at a brisk pace. Approximately 15,000 to 20,000 tons of bessemer and more than 5,000 tons of foundry iron have been placed for export during the week, while domestic purchases in the immediate New York territory totaled at least 20,000 tons. In addition, it is expected that action will be taken on a number of important inquiries which last week were reported as being before the trade. The foreign and domestic business now under negotiations in this market forms a total of 75,000 to 100,000 tons, most of which is steelmaking iron. The 35,000 to 40,000 tons recently inquired for by the Worthington Pump & Machinery Corporation, has not yet been closed, but it is expected that action will be taken no later than this week. In some quarters it is believed that only about half of this tonnage will be placed at this time. A Dover, N. J., stovemaker, who wants 5,000 tons of No. 2X and No. 2 plain for first half shipment, is expected to place this iron this week. It is understood the malleable syndicate has closed for some iron, but this report is unverified and no tonnage is mentioned. A Depew, N. Y., steelmaker still is in the market for 10,000 tons of basic and 2,000 to 3,000 tons of low phosphorus for last half. A Newark, N. J., melter placed 1,000 tons of No. 2X and 600 tons of No. 2 plain iron for next year's shipment. A Connecticut melter has placed 4,000 tons with two eastern Pennsylvania furnaces for first half shipment. Prices are unchanged with the exception of basic, which last week was sold for $19.75 and which now is quoted at from $19.75 to $20, with the market probably nearer the outside than the inside figure.

Malleable Inquiry Out

Cincinnati, Aug. 29.—Inquiry for malleable iron has begun to come into this market in good volume. A Michigan user is asking for 10,000 tons of this grade, and a northern Ohio manufacturer is out for 3,000 tons. Numerous smaller inquiries are before the market, mostly for shipment over the first half of next year. The Kokomo Steel Co., Kokomo, Ind., has closed for around 20,000 tons of basic iron for first half delivery. The United States Radiator Co., Detroit, has purchased a round tonnage of foundry iron for its various plants, most of which went to lake and eastern furnaces. Michigan users have taken 2,500 tons of charcoal iron and 1,000 and 1,200 tons of northern iron in the past few days. An Indianapolis user has closed for 500 tons of foundry iron for the first half of next year. A good inquiry is out for delivery over the last half of next year, but dealers are slow to close that far ahead.

Southern Ohio No. 2 foundry iron is now being quoted by one stack at $18, Ironton basis, for the last half of this year, and the first half of next year. Basic iron is also quoted at the same figure. Other stacks are holding both No. 2 foundry and basic at $19, Ironton basis, for delivery up until July, 1917.

Southern furnaces have ceased to offer No. 2 foundry iron at $13.50, Birmingham basis, but resale iron is still obtainable at that figure. Furnace prices range from $14 to $14.50 for the last quarter of 1916, and the first half of 1917.

High Speed Steel

Sold in Large Quantities at Cleveland at $2.50 per Base Pound

Cleveland, Aug. 29.—Some sales of high-speed steel of good size have been made in the Cleveland district in the last few days, one amounting to $7,500 for shipment to a western Pennsylvania plant and one of from $18,000 to $20,000 for shipment to a plant in New York state. In these sales the price made was $2.50 per base pound. Some sellers are quoting as high as $2.75. A few months ago, when tungsten ore was higher than it is at present, high-speed steel was selling at $3.50 per pound.

Making Ties

Birmingham, Ala., Aug. 29.—The Connors-Weyman Steel Co., Birmingham, has leased and put into operation the small rolling mill plant formerly operated by C. H. Parsons, located in the eastern portion of the city. At present the plant is being run by three shifts on output of "Belgian ties" for use in South America. These ties were formerly supplied by Belgian operators.

(*For complete prices see page* 442.)

Ten Million Tons

May Be the Movement of Iron Ore on the Lakes This Month

Cleveland, Aug. 29.—While it is not confidently expected that the iron ore movement for this month will amount to 10,000,000 tons, it would not be a great surprise if the figures show that that immense tonnage has been shipped from the iron ore docks of the Lake Superior region. The weather has been favorable, the amount of grain hauled has decreased and all conditions have contributed to a record-breaking movement.

Iron ore shippers state very positively that they will not pay $1 net for the movement of ore from the head of the lakes next year and indications are that the opposition to such a high rate will be very strong. The experience of past years, when very high ore prices have been followed by slumps, is cited, and it is pointed out that an advance to $1 for the carrying of the ore would necessitate an advance to $5.50 for old range bessemer, a price which has not prevailed since 1900, when, following the boom of 1899, the buying movement for 1900 was started Dec. 15, 1899, at an advance of $2.50 per ton over the $3 price paid for 1899 delivery. The making of this price was followed by a slump, failure of buyers to take their ore and generally unsatisfactory conditions, and in 1901 the price was reduced to $4.25 and did not get back to $5 until 1907. In October, of that year, there was a panic and the price for 1908 was reduced 50 cents.

During the past few days, the supply of vessel tonnage has not been equal to the demand for the carrying of ore for this year and a small tonnage of ore was contracted for at $1.25, net, from the head of the lakes for shipment to Buffalo. It is expected that very high rates will be paid on small tonnages during the remainder of the season.

Will Make Ingots

Messrs. R. W. Tener and W. E. Trautman, the former having been affiliated with the United Engineering & Foundry Co., Pittsburgh, for the past 21 years as assistant treasurer, and the latter for the past 12 years, have purchased the plant of the Braddock Machine & Mfg. Co., Braddock, Pa. Both are experienced in handling special specification ingot orders. By Sept. 15 the Braddock company will be able to supply 1,200 tons of open-hearth acid ingots per month. Mr. Tenor will be manager of the steel foundry sales department and Mr. Trautman will be manager of the plant.

Not Enough Steel Bars

Demand is Very Strong and Mills Have Much Trouble in Satisfying Customers—Export Inquiry Heavy

Chicago, Aug. 29.—Demand for steel bars and other forms of finished steel is growing stronger and buyers are more insistent. Apparently a considerable number of domestic users have not covered their probable requirements for first half of 1917 and are just beginning to realize they will have difficulty if they do not cover shortly. The difficulties are beginning already and some domestic users are finding it almost impossible to place any considerable order for first half. Much disappointment is expected to follow the present situation.

Railroads are discovering their need for more rails than they have contracted for 1917 and rail mills find they cannot meet the demand for delivery during next year. It appears that little rail mill capacity remains unsold and new business is almost impossible to place. The same condition in somewhat less degree exists as to track fastenings, for which there is a heavy supplementary demand in the west.

Export demand continues heavy, but under existing circumstances practically nothing is being done in the west toward taking on this business.

Quotations are strong at 2.79c, Chicago mill, for bars and a further advance would not be surprising, although with practically nothing to sell the advance would not profit producers much.

Not So Excited

Philadelphia, Aug. 28.—The steel bar market in this territory does not reflect the excitement which characterized it a few weeks ago. New shell round inquiries are not important and domestic consumers generally are going slowly about committing themselves further. This is due to the fact that these interests are covered pretty thoroughly by contract. Steel bars continue to be quoted at 2.60c to 3c, Pittsburgh, the inside price pertaining to contracts, while on prompt delivery 2.75c to 3c is asked. As previously reported, the market is well sold up and deliveries are hard to get.

Turning Down Business

Buffalo, Aug. 29.—The inquiry for bars, plates and shapes is much larger than it has been for a number of months, according to the mills and agencies of the district. Many producing interests have been forced to resort to pro-rating their tonnages and this is causing a number of large consumers to make added efforts to get needed tonnages. It is figured that the mills will carry over into 1917 a far greater unfilled tonnage than was anticipated earlier in the year. With this situation ahead of them, producers are turning down more business than they are booking, not caring to add to their present obligations.

Pressing for Deliveries

Cleveland, Aug. 29.—Consumers of steel bars are pressing mills for deliveries and representatives of the latter are putting in a good part of their time trying to satisfy customers. In some cases, the need is urgent, as some plants are consuming more rapidly than deliveries are being made.

Better Bar Inquiry.

Chicago, Aug. 29.—An increasing inquiry from manufacturers is being received by bar iron makers, as consumers are seeking to supplement tonnage already bought for third and fourth quarter. Most of this appears to be bona fide and sales usually result. A portion of the inquiry is contingent on railroad car orders being placed, and under present conditions this may not result in orders for the mills.

Specifications are being received in larger volume and full tonnages are being taken out. The quotation remains steady at 2.35c, Chicago mill, for any delivery during the present year. Some mills occasionally obtain a higher price for special considerations, although the lower price is really the market.

Hoops and Bands

Pittsburgh, Aug. 29. — Manufacturers of hoops and bands are not inclined to take on much additional business, owing to the fact that the mills are stocked with orders which will provide them with work extending over a period of eight months. Steel hoops are demanding 3c as a minimum and bands are being held at 2.60c. Premium prices are being paid for fairly prompt delivery of both of these products.

Shafting Strong

Pittsburgh, Aug. 29.—The demand for cold rolled shafting continues to be active in the Pittsburgh district and makers of this product are selling at from 15 to 20 per cent off list for carload lots. Small orders are being taken at irregular prices, ranging as high as 5 per cent off list. Orders now being taken for shafting call for deliveries extending from three to nine months.

(*For complete prices see page* 442.)

Benzol Market

Is Still Uncertain as Prices Have Not Been Determined for Future

New York, Aug. 29.—The market on the coke oven by-products particularly those employed in the manufacture of high explosives, still is in the same indefinite condition as to the future as has been described previously. The makers of toluol and pure benzol are well sold up, and, in fact, have comparatively little material which still may be disposed of for this year's shipment.

Nothing new, however, has developed with reference to new contracts. The foreign governments have not yet gotten to the point of placing further contracts for high explosives, and until these materialize, the situation between the manufacturers of trinitrotoluol and picric acid, and the makers of pure benzol and toluol, will continue unchanged, and contract prices indefinite, particularly on toluol. The contract market on pure benzol continues unchanged at 70c a gallon. Due to some activity in spot deliveries by second hands, however, spot prices may be quoted at 62c to 65c a gallon. Prices of toluol continue nominal in view of the pending situation as to further war contracts. Considerable business in solvent naphtha is reported and prices of this product are unchanged at 45c a gallon for spot shipment and 40c for contract shipment.

Demand for sulphate of ammonia this week comprised 100 to 200-ton lots for September and October shipment, and came from contract consumers who need additional material to fill requirements which are larger than they had estimated. On the whole, the amount of business booked during the week was not large. The situation is very strong and quotations have been advancing slightly with the result that the market on spot and near-by contract shipments may be quoted at $3.55 to $3.60 per 100 pounds at tidewater.

Market Prices for Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.62 to .65
Toluol	Market not defined
Solvent naphtha	.45

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$3.55 to 3.60

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.70
Toluol	Market not defined
Solvent naphtha	.40

Per 100 Pounds at Seaboard.

Sulphate of ammonia (nearby)	$3.55 to 3.60

More Shapes for Export

J. P. Morgan Places Order for Another Round Tonnage—Japanese Ship Building Company Also Buys

Philadelphia, Aug. 28.—The export business in plain structural shapes which has been placed lately by J. P. Morgan & Co., was augmented last week. One of the mills which previously received from that interest 14,000 tons for shipment over the remainder of this year took an additional 10,000 tons, for shipment over the first four months of next year. Activity in the shape market was increased further by the placing, by a Japanese ship building interest, of a large tonnage of shapes to be exported to that country. The domestic demand is active; but no large tonnages are reported. Jobbers are believed to be in need of material, as they are showing more interest in the market. A western jobber just placed with a mill in this territory an order for 2,000 tons of shapes and bars. The shape market here is quoted at 2.60c to 3c, Pittsburgh. Some further contract business was done last week at 2.50c, Pittsburgh, but it is believed 2.60c now could not be shaded. This price applies also to good-sized tonnages for extended deliveries. On the general run of business for prompt shipment, the market is quoted at 2.75c to 3c, Pittsburgh.

Structurals Move Better

Chicago, Aug. 29.—Builders in need of structural material evidently have come to the conclusion that prices are not likely to recede and such new work as must be undertaken is now coming out.

Contracts closed in the west during the past week are confined entirely to industrial and public building, nothing in the way of private enterprise being noted. The largest tonnage involves 1,600 tons for the post office at Portland, Ore., and Cook county, Ill., takes 1,000 tons for a powerhouse and laundry building at the county hospital.

Demand for shapes from mill continues heavy, other purposes than fabricated structural material calling for this product. The quotation is still 2.79c, Chicago mill, and is strong.

Not So Active

Pittsburgh, Aug. 29.—There is a decided letup in the demand for structural steel for building operations in the Pittsburgh district. Most of the demand on structural manufacturers in this district is coming from the east, where bids are being made on several projects involving fair-sized tonnages. Railroads are using a moderate amount of shapes for car repairs and the material for additions to steel mills and metal working establishments is furnishing an outlet for some of the product of the mills. The price of structural shapes ranges from 2.60c to 2.75c, Pittsburgh. At the convenience of the mill, the minimum price is not usually exceeded, but for fairly prompt delivery, the maximum has prevailed in a number of instances.

Active in East

New York, Aug. 29.—The eastern structural market continues to be featured by an active demand. Structural lettings and new work continue to come out in good volume. Fabricators, in fact, would be satisfied with a much smaller volume of business than they now are doing. This is due to the difficulty in obtaining steel from the mills and also to the fact that due to the heat and other causes they are able to operate their plants at about 80 to 85 per cent of their capacity. Prices on structural steel for ordinary building work now range between $70 and $75 f. o. b. cars New York. The fabricated steel for apartment houses now being let is quoted at about $72 to $74 per ton f. o. b. New York. The minimum erected price on bridge work now is $83 to $84. The market on plain structural material now may be quoted at 2.60c to 2.75c, Pittsburgh, and 2.769c to 2.919c, New York. The mills are able to make prompt shipment on the general run of material.

New Goodrich Building

Cleveland, Aug. 29.—The Goodrich Rubber Co., Akron, which had intended originally to use structural shapes in erecting an addition to its plant and afterward adopted concrete construction, has placed 800 tons for trusses for the roof of the new building with the Kenwood Bridge Co. Chicago. The steel is to be fabricated in that city. No new building projects of importance are pending in Cleveland.

CONTRACTS AWARDED.

United States government, post office, Portland, Ore., 1,607 tons, to Northwest Steel Co.

Cook county hospital, powerhouse and laundry building, Chicago, Ill., 1,017 tons, to American Bridge Co.

Santa Barbara county, Cal., Santa Inez river bridge, 474 tons, to American Bridge Co.

Charcoal Iron Co. of America, shaft sets for Yale mine, Bessemer, Mich., 317 tons.

Central Elevator, new, Buffalo, 1,200 tons, contract to Buffalo Structural Co., Buffalo.

Goodrich Rubber Co., Akron, addition, 800 tons for trusses, Kenwood Bridge Co.

Fifty-ninth street East River tunnel, 1,700 tons to the McClintic-Marshall Co.

Southern Railroad Seneca river bridge, 1,600 tons, McClintic-Marshall Co.

Piedmont & Northern Railroad, Catawba bridge, 500 tons to Virginia Bridge & Iron Co.

Consolidated Kansas City Smelting & Refining Co., El Paso, Tex., 750 tons for smelting plant to Kansas City Structural Co.

Congoleum Co., Marcus Hook, Pa., 400 tons for new buildings to Phoenix Iron Co.

Queens Borough Gas & Electric Co., 250 tons for power plant at Far Rockaway, L. I., to Hedden Iron Construction Co.

Bosch Magneto Co., Springfield, Mass., 200 tons for plant addition to the American Bridge Co.

Baltimore & Ohio Railroad, 250 tons bridge work to American Bridge Co.

Boston & Maine Railroad, 300 tons for locomotive shop at East Deerfield, Mass., 300 tons to American Bridge Co.

Y. W. C. A. building, Troy, N. Y., 300 tons to Eastern Bridge & Structural Co.

Donner Steel Co., Buffalo, plant additions 500 tons, to McClintic-Marshall Co.

Fishel apartment, New York, 600 tons to Passaic Construction Co.

Levy apartment, Fifty-eighth street, New York, 350 tons to Passaic Construction Co.

Loft building, Thirty-sixth street, New York, 900 tons to Harris-Silber-Baker Co.

Apartment building, West Tenth street, New York, 300 tons to Hinkel Iron Works.

CONTRACTS PENDING.

Edward G. Budd Manufacturing Co., Philadelphia, 700 tons, plant addition, taking revised bids.

Tissman apartment, Seventy-second street, New York, 800 tons, bids in.

McLaughlin apartment, One Hundred and Fifth street, 700 tons, bids in.

Ring & Ring apartments, 1,200 tons, bids in.

Borschard apartment, Seventy-first street, 600 tons, bids in.

Pennsylvania railroad hotel, New York, estimated 12,000 tons, plans in progress.

Arlington hotel, Washington, 5,000 tons, bids being taken.

Pennsylvania railroad bridges 1,300 tons, bids in.

Some Pay Premiums

Pittsburgh, Aug. 29.—The manufacturers of bolts, rivets, reinforcing bars and other similar products have flooded the steel bar market with sufficient specifications to sustain the activity which has prevailed during the past few weeks. The new prices resulting from the increase announced some weeks ago, have now been firmly established and very few sales at prices under 2.60c, Pittsburgh, are noted. In fact, some of the smaller manufacturers are actually receiving premium prices for prompt delivery.

The demand for bars for munitions, while a strong factor in the market, has not created an unusual amount of interest in this district. Agricultural implement buyers are said to have entered the market.

(*For complete prices see page 442.*)

Sheet Buying Irregular

Market Lags in Some Centers, With Increased Firmness in Others—Cost of Raw Materials Important Factor

Youngstown, O., Aug. 29.—The volume of sheet buying in this district in the past week has been disappointing to the producing interests. In the first few days of last week, inquiry picked up rapidly, the most encouraging feature being a revival of interest among buyers of light gage sheets. The amount of business closed in the past few days has not confirmed the belief held 10 days ago that a buying movement had begun.

Blue annealed sheets continue to hold the center of the stage, their price being proportionately higher and the demand stronger. Additional capacity that has come in during recent weeks in other districts has had a softening influence on the market, so that the premium prices of 3.25c and 3.35c paid several months ago for the heavy gages have completely disappeared. The base size, No. 10 gage, is now quoted generally at 3c, although quotations of 3.10c are frequently snapped up. Most of the mills are well protected on forward business on this grade. The demand for light sheets, on the other hand, continues to be disappointing in volume. While most manufacturers advanced their minimum quotation to 3c several weeks ago, the 2.90c figure has not disappeared and is being shaded occasionally on desirable business.

One factor that makes for irregularity in sheet prices is the wide difference in the cost of raw materials to the various sheet mills. Sheet mills which are merely departments of large steel plants can figure their sheet bar costs on several bases—either that of cost of production or that of potential value in other finished lines, most of which are higher than sheets. Some sheet mills are protected by minimum and maximum contracts and are securing semi-finished steel at $26, $28 or $30. Other mills which rely on quarter to quarter adjustments may be paying $36 to $39 for third quarter supplies, with a certainty that fourth quarter costs will be higher. The result is that business can be taken by some mills at a figure below the cost line of other plants, the situation making for irregularities that only an improvement in demand can correct.

Fair tonnages of galvanized sheets were involved in this week's business. This grade is held rather firmly at 4.25c by local mills, although some orders have been lost at that price, indicating that in other districts 4.15c and even lower is being quoted. An encouraging factor was the appearance this week of inquiries from parts of the south and southwest that had been out of the market for months.

A persistent report is heard in the valleys that one sheet mill, which is part of a large steel company's organization, will be closed down indefinitely, the sheet business being confined to the concern's other sheet mill. An official of this company denied today that there was any basis for this report.

Production increased somewhat this week due to an improvement in weather conditions, but an impending shortage of cars is engaging the interest of steel mills. The railroads are not furnishing cars as freely as they were several weeks ago and some shipments have been delayed. With the crop movement becoming heavy, it is feared that this condition will become worse.

Sheets Show Strength

Chicago, Aug. 29.—Steel sheets are showing considerable strength, although this is not yet actively reflected in quotations, which remain approximately the same as for the past fortnight. Some sheetmakers who are still running on cheaper sheet bars have not advanced to the level which will be necessary when more expensive sheet bars purchased later come to be used. Some smaller sizes of sheets are obtainable under the market when it is possible to roll them on tin mills and various factors have retarded increase in prices to a level equal to other finished steel products. These factors seem to be lessening in influence and decided increases in quotations on all classes of sheets are expected.

Firmer at Pittsburgh

Pittsburgh, Aug. 29.—Blue annealed and black sheets are in strong demand and the market at the present time is unusually firm. Blue annealed sheets are quoted at 3c to 3.10c, although a greater range exists, due to the fact that sellers are shading prices in some cases and asking higher prices in others, where prompt deliveries are essential. Sales as low as 2.90c and as high as 3.25c have been noted. Black sheets are quoted at 2.90c to 3c, but it is understood that a prospective purchaser of this product, who thoroughly canvassed the market, was offered sheets at prices ranging from 2.90c to 3.15c. There is a strong tendency for prices to rise above the 3c maximum now quoted.

In spite of the apparent weakness of galvanized sheets, due primarily to a slight falling off in the domestic demand, and also to declining spelter prices, manufacturers have the opportunity of disposing of their sheets to the export trade at the higher prices which have prevailed. Although it is said that domestic buyers are securing small tonnages at as low as 4.15c and 4.20c, it is understood that export sales are being made on a basis of 4.25c to 4.40c, Pittsburgh. This demand from foreign countries is exceedingly strong, due to the fact that the British embargo has thrown consumers in the entire world upon the American manufacturer.

Fair Demand

Philadelphia, Aug. 28.—Domestic demand for sheets is good but not extremely active. The market continues to be quoted at 3c to 3.50c, Pittsburgh, for No. 10 gage blue annealed. Export inquiries continue to be reported, but none of these has resulted in business.

Some Improvement

Cleveland, Aug. 29.—The sheet market is showing some improvement in prices and the usual quotation on No. 28 black is 2.90c to 3c. There is still some irregularity in the quotation on blue annealed.

(For complete prices see page 442.)

Tin Plate Mills

Are Reserving Tonnages for Customers —No Price for Next Year

Pittsburgh, Aug. 29.—Tin plate mills in the Pittsburgh district are practically sold out for the last half of 1917. There is an insistent demand for plates for delivery in the first quarter of 1917, and it has been necessary in some cases for the tin plate people to reserve tonnages for their customers, but they have firmly held to their decision not to quote prices. As a result of this, consumers are being assured that their requirements will be met, but that the price will be determined later. During the past week, it developed that several large consumers who had neglected to place contracts are now having a difficult time in trying to find mills that will supply their needs. There is a wide range in the price of tin plate, for prompt delivery, due to the fact that some mills are willing to make concessions to regular customers. Prices ranging from 5.50c to 6.25c, base, are noted.

Heavy Orders for Plates

Placed in Eastern Pennsylvania, Including Good Sized Tonnages for Ship Building in This Country and in Japan

Philadelphia, Aug. 28.—An exceedingly heavy business characterized the eastern plate market last week and the demand continues unabated. One eastern Pennsylvania mill is sold up on sheared plates pretty close to the end of the first half of next year and it has stopped taking business excepting from its regular customers. In accordance with this policy, it refused to quote on a number of tonnages, including one involving 6,000 tons. In universal plates, the situation is not so acute and many users are taking advantage of this fact by ordering universal plates to be used as a substitute for sheared plates. The former may be obtained from eastern Pennsylvania mills for delivery in six to eight weeks, at the same price as the latter, 4c, Pittsburgh, or 4.159c, Philadelphia. Some contracts for sheared plates still were being taken by eastern Pennsylvania mills last week at 4c, Pittsburgh, for specification by the end of this year, and to be shipped at the convenience of the mill. Western Pennsylvania makers are quoting 3.50 to 4c, Pittsburgh, on regular plate mill specifications, and 2.90 to 3c, Pittsburgh, on contracts. Deliveries are so hard to obtain, however, that a number of western Pennsylvania consumers have been calling eastern Pennsylvania mills on the phone in a vain endeavor to secure material. One of these consumers wanted 1,000 and another 1,500 tons. A Seattle ship builder last week closed for 7,000 tons of plates distributing the business among two western Pennsylvania and one eastern Pennsylvania mills. Japanese shipbuilders closed for several thousand tons with an eastern Pennsylvania mill. A Buffalo steel maker took 500 tons for new buildings. An inquiry for 7,000 tons for a riveted pipe line on the Pacific coast is to be closed this week.

Good Demand

Pittsburgh, Aug. 29.—The scarcity of plates in middle western and eastern industrial centers has been felt in the Pittsburgh district, where manufacturers have been asked to relieve the shortage. As a result, plate mills are busily engaged in meeting the requirements of railroads, ship builders, structural fabricators and others, whose requirements are exceedingly heavy at this time. It is understood that demands from Chicago, Cleveland and Philadelphia have been made on local mills for considerable tonnages of plates. The prices in this district range from 3.50c to 4c for prompt deliveries, while the contract price is 3c.

Plates Lead Market

Chicago, Aug. 29.—Demand for steel plates for ship and car building is a feature of the market, although no especially large tonnages have been placed in the past few days. The leading interest has little tonnage remaining, but an independent platemaker still has some capacity left on the plate mill, which probably will be disposed of at an excellent price.

Plates are quoted at 3.19c, Chicago mill, with the market showing great strength.

Unusual Proposition

Cleveland, Aug. 29.—The plate market is strong and consumers of boiler plate are having considerable difficulty in placing their orders. In one case a Pennsylvania platemaker offered to give delivery on a new order for boiler plate provided the customer would cancel another order placed a number of months ago at a lower price than now prevails, but it is not probable that this proposition will be accepted.

Coke Production

Is Still Hampered by Labor Shortage in Connellsville Region

Pittsburgh, Aug. 29.—The production of coke continues to be hampered by the shortage of labor and this has served to keep the output on a par with the demand. There has been no surplus of furnace coke, due to this fact. Prices in all cases seem to be comparatively firm. Spot furnace coke is quoted at $2.75 to $2.85 and prompt foundry, which was exceedingly firm at one time last week at the price of $3.50 or more, is now quoted at $3.25 to $3.50. Very little coke is being sold on the contract basis at this time and the nominal quotations are $2.40 to $2.50 for furnace and $3.15 to $3.40 for foundry. *The Connellsville Courier* reports the production for the week ending Aug. 19 as 408,060 tons, which is a slight increase over the production of 403,340 tons reported for the week ending Aug. 12.

Foundry Coke Active

Philadelphia, Aug. 28.—An active demand for foundry coke is reported by sellers in this market. Not all the business offered is taken, however, due to the difficulty of obtaining shipment of the material. The minimum price on good foundry brands is $3.50, ovens, and higher is being done. Furnace coke is quiet, due to the fact that all the consumers in this territory are covered by contract. Furnace coke is quoted at $2.85, ovens.

(For complete prices see page 442.)

Southern Coke Quiet

Cincinnati, Aug. 29. — Wise county Pocahontas, and New River coke continue at a standstill, despite the fact that increased strength and more activity is reported from the Connellsville district. No demand is out for either furnace or foundry grades. Wise county and Pocahontas furnace coke are quoted from $2.85 to $3.25, ovens, and New River foundry coke at $3.75 to $4.25, both for contract delivery.

Foundry Grades Higher

Cleveland, Aug. 29.—Owing largely to scarcity of labor in the Connellsville region, prompt foundry coke is now quoted at a minimum of $3.50 and the same price is asked on contracts. A moderate amount of buying has been done by Cleveland foundries, but there is some hesitation on account of unsatisfactory labor conditions.

Delivery Slow

St. Louis, Aug. 29. — Very little inquiry is out for coke, and because of a shortage of labor in the Connellsville district, deliveries are reported to be hard to make. Standard foundry grades are quoted at $3.25 to $3.50 according to delivery.

Pipe is Strong

Reported Projects of Large Size Not Very Seriously Considered

Pittsburgh, Aug. 29.—The demand for all grades of tubular goods, including lap and butt welded steel pipe and boiler tubes, continues strong, with the lap welded product slightly more active than the other grades. The large pipe line projects, which have been reported from time to time in some papers, have cut very little figure in the market conditions, as there has been no indication that any of the mills are interested in this business. Manufacturers feel that they have about all the contracts they can attend to at present. In some cases, high prices were offered to tempt the mills into making prompt deliveries, and in some cases these offers are being accepted on that basis.

Embargoes Tie Up Scrap

But Some Material Consigned to Mills Has Been Reshipped—Market Drags in Most Centers

Pittsburgh, Aug. 29.—There is only a slight activity in the scrap market in the Pittsburgh district, due to the fact that most of the mills are fairly well supplied with steel making material. Embargoes at mills in the Monongahela valley are still in effect, although scrap originally consigned to these districts has, in some cases, been reshipped to other plants. Prices for the common grades of scrap have remained stationary for a period of several weeks, there having been an insufficient number of sales involving appreciable tonnages, to re-establish prices.

A firmer demand for cast borings, which developed during the latter part of the week, served to bring the price of this material up to $8 to $8.50. The few sales of other grades of scrap, which have been made during the past week or 10 days, have been induced by conditions which made such transactions extremely advantageous to the purchaser. In some instances, dealers and producers who have had an unusual supply of scrap on hand have sold sufficient quantities to relieve the congestion of their storage yards. The railroads are known to have been accumulating vast tonnages in their yards. The Pennsylvania railroad has issued a list, including heavy tonnages of heavy melting steel, turnings, light and heavy cast iron, cast borings, etc., aggregating over 12,000 tons.

Scrap Seems Firmer

Chicago, Aug. 29.—Somewhat better conditions are beginning to show themselves in the iron and steel scrap market in Chicago, brokers evidently feeling a possible shortage in supplies, as they are beginning to buy more freely. This activity, in marked contrast with the slow conditions that have prevailed, is not caused by buying on the part of consumers. The latter have not entered the market recently, but it is believed they may do some buying before long.

Although rolling mills and steel mills are not in need of further supply, they have drawn on their reserves to some extent and can take in further supply, if conditions of the market make it appear wise to buy at this time. For this reason, brokers expect some activity and sales of tonnage to bring reserves back to normal.

Effects of the hot period and of labor shortage are being felt keenly and it is difficult to find sufficient men to handle and prepare scrap for sale.

Railroad offerings continue to be light and the only list now current in the west is offered by George W. Jennings at his Eighty-seventh street yard, Chicago, containing 1,535 tons, of which 400 tons are old car wheels.

Buying at Buffalo

Buffalo, Aug. 29.—Dealers of the district report the development of a strong buying movement that was not expected to materialize until some time in September. Heavy melting steel and cast borings are the leaders in the demand coming from local consumers as well as from users in the Pittsburgh and valley districts. Heavy melting steel prices are stiffer, but not sufficient to change the schedules as yet. A marked advance in prices is looked for at any time now.

The limited lot tonnages that are being moved at the prevailing market schedule, it is expected, will hold prices until the larger demand gets under way and then an advance is looked for. Many of the scrap yards are discounting the market situation and are offering higher prices for scrap than the mills are paying at the present time.

Plenty of Scrap Available

Philadelphia, Aug. 28.—The comparatively large quantity of iron and steel scrap available, which has brought about a general reduction in prices over the past couple of months, continues the feature of the old material market. It generally is believed, however, that prices are about as low as they can go, and dealers say the present deadlock can be broken only by a resumption of buying at the levels which now prevail. Only one further reduction was effected last week; this was on machine shop turnings, which now are quoted at $7.25 to $7.75, delivered eastern Pennsylvania.

Large quantities of borings and turnings continue to move from this territory to Pittsburgh for use in blast furnaces.

Large export inquiries continue to be received, mostly from Italy. These involve principally old axles, rails, and heavy melting steel. None of these tonnages are being placed, however, because ocean freight rates are approximately 166 2/3 per cent of the value of the scrap in this market. For instance, the freight rate now being asked to Italy is $25 a ton.

The embargo on shipments into Coatesville, Pa., continues in effect. This embargo, which has been operative about four months, was lifted for a few days temporarily a month ago and since then no further shipments have been received at that point.

(*For complete prices see page* 442.)

Sentiment Improves

Cleveland, Aug. 29.—Although trading in iron and steel scrap in this district is of comparatively small proportion the sentiment is of an unlifting nature. The stronger position of pig iron and finished steel products is reflected in firmer prices for scrap, even if there is no actual rise in the general schedule. The market is spotty, buying having been concentrated at times on various items among which have been cast borings, machine shop turnings, and heavy melting steel. A valley interest has closed for several months' requirement of turnings at a range from $7.25 to $7.50 a gross ton, delivered. Although the market in cast borings for a day or two last week was strong and as high as $9 gross, Pittsburgh, some softening has taken place until present prices are $8.50 and below. Heavy melting steel is selling at $14.75 to $15.25, gross, Cleveland. Hand bundled sheet scrap has come down to $11 to $11.15, gross, valley. Other items of the list are holding steady at prices unchanged from those quoted the past few weeks.

Local mills are still having trouble with the taking of shipments and only a few cars are allowed to pass daily at one or two of the important consumers. Wrought scrap virtually has no market.

Buyers are Busy

Birmingham, Ala., Aug. 29.—The buyers of old material have been busy the past week in the buying of scrap of all kinds from the different furnaces and saw mill interests, and a visit to their yards reveals the fact that heavy stocks are being taken on. They also report a gradual increase in sales, though not of sufficient volume to warrant an advance in prices. The scrap being purchased is at a higher figure than could be profitably disposed of on present selling market. This is an indication of the faith in an advance in pig iron prces.

Inquiry for Cast Borings

Cincinnati, Aug. 29.—An inquiry for cast borings is in the market from Youngstown, O., involving a purchase of about $5,000. Dealers here report that it is hard for them to secure this material except in small lots. Cast borings today are quoted as low as $5 per net ton, f. o. b. Cincinnati. The general condition of the market is weak and uncertain because the continued lack of sales has made it hard for dealers to set definite prices.

Brisk Bidding

St. Louis, Aug. 29.—Activity among scrap dealers continues in this market,

and the bidding on railroad lists has been brisk with prices steadily advancing. Iron and steel axles are in great demand for export and they are commanding prices of from $27 to $29 a net ton. While stocks in consumers' yards are rapidly being reduced, consumers still refrain from entering the market, evidently waiting for a slump in prices. There are no railroad lists of consequence before the market this week.

Cast Scrap in Demand

New York, Aug. 29.—The principal change in the scrap market in this territory is a much better demand for cast scrap for use in foundries. This material is hard to get, with the result that prices already have advanced approximately 25c per ton. If the demand keeps up according to present indications, still further advances are expected to materialize. Demand from eastern Pennsylvania mills for rolling mill scrap continues active. There is an especially good demand for wrought scrap. Turnings and borings are quiet. The embargo on Coatesville, Munhall and other Pennsylvania consuming points continues to curtail business in scrap by many thousands of tons.

Warehouses Are Busy

Orders Limited by Inability to Replenish Stocks— Rivets Are Advanced at Chicago

Chicago, Aug. 29. — Chicago warehouses have advanced structural rivets to a basis of 4c and boiler rivets to 4.10c. This brings the Chicago rivet market more nearly to prices asked by eastern producers than has been the case for a long time. The situation here has been that it was usually possible to buy rivets from store at a lower price than they could be bought from eastern mills.

Another advance is on black sheets, the new price being $3 per ton higher than the former quotation, No. 28 gage being quoted at 3.35c, Chicago store, and 3.50c, St. Paul.

Warehouse business continues steady, delay on delivery from mills making consumers anxious to obtain their material and resorting to warehouse for it.

Some difficulty is being experienced by warehouses in obtaining stock from mills and this applies to practically every line, except possibly to black sheets, on which there is no particular delay.

Strong Demand in Pittsburgh

Pittsburgh, Aug. 29.—Warehouses in the Pittsburgh district report an active demand for all warehouse goods. Structural materials are being quoted at 3.10c, Pittsburgh, and a considerable amount of business is being reported. Plates are strong at prices ranging from 3.75c to 4c, Pittsburgh. The larger sizes of reinforcing bars are bringing from 3.25c up. Steel bars are particularly active at 3.10c, while hoops, quoted at 3.85c, base, are in such demand that it is almost impossible for the warehouses to supply the needs of all prospective customers.

Galvanized Irregular

Cleveland, Aug. 29.—Warehouses in Cleveland are extremely busy and the volume of their orders is limited only by their ability to keep stock replenished. In many cases it is impossible to keep as large a stock as is desirable. There has been considerable irregularity in the price of galvanized sheets and recently concessions have been freely made below 5 cents per pound. Reports from Detroit indicate that the price in that city is being maintained at 5 cents for No. 28 galvanized.

Warehouses Busy

Cincinnati, Aug. 29. — Warehouse prices continue unchanged, cold rolled bars being held at 10 plus the list price, hot rolled bars at 3.20c to 3.75c, and shapes and plates from 3.20c to 3.50c. Warehouses are selling only few and scattered lots of sheets, as most business on this material is being done by the mills direct. Business on twisted reinforcing bars and light structurals is good.

Active Demand in East

New York, Aug. 29. — Demand for finished steel products, for immediate shipment from warehouse in this territory, is exceedingly active and at least one warehouse interest states that the bulk of its business in August promises to eclipse any previous monthly record. Due to the heavy obligation of the mills, it is difficult for the warehouses to keep up their stocks and as a result the latter interests frequently have much difficulty in making shipments. In many cases, where the nature of the order permits, substitutions are being made to an increasing extent when the material specified is not available. The current demand comes from all kinds of domestic concerns and is not confined to any special industries. A large demand comes from concerns which are adding small extensions to their plants. The warehouses report some export demand, but this is not as large as a few months ago. Prices are quoted higher. On steel bars, iron bars and shapes, nothing less than 3.25c, New York, can be secured and higher prices occasionally are being done. On plates the bulk of the business is going at 4c, New York, and the market may be quoted at this figure.

Cutting in Galvanized

St. Louis, Aug. 29. — Considerable competition has been going on to reduce warehouse prices on No. 28 galvanized sheets in this market, and it is reported that while they are quoted at $4.75 to $5, a price of $4.70 has been made on large quantities.

(For complete prices see page 442.)

Cast Iron Pipe

Shows Increase in Inquiries in Alabama District

Birmingham, Ala., Aug. 29.—The high pressure pipe market conditions have shown some improvement in the matter of increased number of inquiries, also demands for shipment of orders already on the books. There is being experienced quite a little delay on account of insufficient car supply. Manufacturers in general feel hopeful that the present proposed advance in rate will be set aside. The soil pipe plants of the Birmingham-Gadsden-Anniston districts are running about 65 per cent time and about the same capacity. These interests report that notwithstanding the proposed rate advance, very little concern was felt by Pacific coast buyers in covering anticipated needs.

Little Inquiry

Chicago, Aug. 29.—In addition to a letting on 1,300 tons, Aug. 30 at Hammond, Ind., and on 1,800 tons Sept. 1 at St. Louis, bids will be taken Aug. 30 at Cincinnati on about 750 tons. This represents about all the business in prospect for the immediate future by cast iron pipe makers.

The United States Cast Iron Pipe & Foundry Co. has taken 300 tons at Fond du Lac, Wis., and 100 tons of specials for the city of Chicago.

Private Demand Active

New York, Aug. 29.—While public lettings are at a minimum in the cast iron pipe market, private demand is keeping up well, so that on the whole, a satisfactory volume of business is being booked. Price views are stiff, especially in view of the likelihood that prices on foundry pig iron may advance shortly. Quotations continue about on the basis of $30.50, per net ton, for 6-inch, class B or heavier pipe, f. o. b. New York, while for class A pipe, prices are $1 per ton higher. Included in pending business are 500 tons of 4-inch to 10-inch pipe for East View.

Steel Foundries Take War Orders

Large Tonnages of Castings to be Used for Munitions—Foreign Buyers Try to Contract for Entire Output of a Southern Blast Furnace for a Year

Shell steel orders placed during the past week are reliably estimated to total 100,000 tons. Of the 150,000 tons that were unplaced a week ago, 50,000 tons thus remain to be covered. The tonnage placed during the week included one order for 60,000 tons taken by steel producers and one of 40,000 tons placed with steel foundries. The latter order is unusual and indicates the expedients being adopted to meet the insistent demands for American steel for war purposes. This steel is to be cast into small ingots and machined directly, without being reduced in a rolling mill.

The comparatively small tonnage of shell steel still unplaced cannot be taken as indicative of a falling off in foreign demand. Most of the steel mills are so well filled on forward business in shell steel that further inquiries are known to be futile. Large tonnages of steel are still desired, however, and are being obtained in circuitous ways. For instance, one Ohio mill on Saturday sold 1,500 tons of odds and ends of bessemer steel at $44. This steel was officially classed as billets, although the largest piece weighed only 80 pounds. It was the accumulation from one of the company's finishing mills. Delivery had to be guaranteed in 48 hours, and the steel was rushed to an Atlantic seaport and is now afloat.

Another expedient being tried by foreign buyers is to buy the entire output of certain merchant furnaces for one year, or longer, if possible. An offer of this character has been received by one firm and calls for the operation of one furnace, which is in the Birmingham district on basic. As far as known, this is the first attempt that foreign governments or agents have made to buy basic. A heavy export demand for bessemer has been in evidence for some weeks. The prospect of additional merchant furnaces being changed over to run on steelmaking grades is engaging the interest of domestic consumers.

While the shell steel involved in the recent buying movement was bought generally at 3.75c. as high as 4c has been paid for prompt delivery. Shellmakers, who have found themselves short of steel supplies have offered heavy premiums for prompt shipments.

The market for shell steel discards has strengthened. As pointed out last week, the abundance of these discards forced prices down to $25 and $30 a few weeks ago. At these figures, foreign buyers quietly bought up 100,000 tons for export. These discards, for the first time, are now being used in making parts of the finished shells. The quotation on discards for shell-making purposes is now $38. For reinforcing rods, some domestic buyers have bought at $28.

Billets Strong

Few Transactions Reported and Prices are Uncertain

Youngstown, O., Aug. 29.—The absence of sales of semi-finished materials during the past week precludes the definite fixture of prevailing quotations. The insistent demand for steel in almost every form, however, continues to contribute strength to the market for semi-finished steel and there is little doubt that any tonnage offered for sale now would command a price within the quoted prices of $45 to $50. Local producers are well sold ahead and are not in a position to accept either domestic or export business for even reasonably prompt delivery.

Good Inquiry, Little Business

Philadelphia, Aug. 28.—A great demand for billets, slabs and ingots continues to feature the semi-finished market, but, due to the difficulty in getting this material, comparatively little business is reported. New inquiries are out both from domestic and foreign sources and these involve a large tonnage. In addition, a number of steel mills in this territory which are unable to secure as much tonnage from their own melting departments as they would like would take all the semi-finished material offered, although these concerns, due to the fact that they have a thorough understanding of the situation, are not inquiring. The minimum price on open hearth rerolling billets now is $48, eastern Pennsylvania mill, and as high as $55 has been done. The minimum on forging billets is $65, eastern Pennsylvania mill, and as high as $85, Pittsburgh, is reported to have been asked in this territory.

Strong at Pittsburgh

Pittsburgh, Aug. 29.—Inquiries for semi-finished materials have not abated during the past week. The prices which have been quoted during the past few weeks still continue to be in effect, and although offers of $50 are rather numerous, no sales at that price have been reported. It would seem that high prices offered by anxious consumers have not tempted manufacturers to take business, which would involve deliveries extending far in advance. This explains the refusal of many producers of semi-finished to accept the tempting offers by consumers.

Pittsburgh Calm

As Strike is Threatened — Hopes to Establish Principle of Arbitration

Pittsburgh, Aug. 30. (By wire.)—Steel men in the Pittsburgh district await the anticipated strike calmly. As yet, no efforts are being made to move products in case of strike. Steel company representatives as a whole sympathize with the railroads and look forward to the strike with the hope it will be a means of establishing the principle of arbitration.

Pig Iron Inquiry

Pittsburgh, Aug. 30. (By wire.)—Several inquiries, aggregating 3,000 tons of bessemer for domestic use, are noted. A small tonnage of export bessemer of special analysis is wanted.

The Kennedy-Stroh Corporation is inquiring for 2,500 tons of basic. The prices of basic and foundry iron remain unchanged, although the tendency for advance is strong.

Advance Suspended

Washington, Aug. 30. (By wire.)—The interstate commerce commission this morning entered an order suspending from Sept. 1 until Dec. 1 the operation of the tariffs which would establish a blanket rate of 94 cents per hundred pounds on structural steel from points east of the Missouri river to Pacific coast destinations. The present rate from Chicago is 55 cents, from Pittsburgh, 65 cents and from New York 75 cents. During the period of suspension, the commission will conduct an investigation as to the reasonableness of the proposed advances.

Will View Destruction

Wrought in France—Prominent Business Men of the United States Sail and Will Visit Many Places of Interest

The American Industrial Commission to France, recently organized by the American Manufacturers' Export Association, sailed from New York for Bordeaux, Saturday, Aug. 26, on the French liner LAFAYETTE, to reciprocate the visit of the French Trade Commission to this country last winter. The personnel of the commission includes the names of prominent American manufacturers and business men, who will investigate conditions throughout France, with a view to determining the most advantageous methods whereby American resources may be made to co-operate in the work of reconstruction in France that will follow the war. The commission announced prior to sailing that its purpose is not to take orders. The length of time the commission will spend in France is indefinite, but the itinerary which has been arranged includes visits to the sections where the greatest amount of destruction has been done around the lines at the front. It also includes a large number of manufacturing establishments, located in approximately 35 French industrial districts. The cities to be visited include Bordeaux, Limoges, Clermont-Ferrand, Vichy, St. Etienne, Lyons, Arles, Marseilles, Grenoble, Chambery, Besancon, Belfort, etc.

The personnel of the commission is as follows:

Chairman, William Wallace Nichols, assistant chairman, Allis-Chalmers Mfg. Co., Inc., 50 Church street, New York.

General secretary, E. V. Douglass, secretary, American Manufacturers Export Association, 160 Broadway, New York.

A. B. Farquhar, president, A. B. Farquhar Co., Ltd., York, Pa.

James E. Sague, former vice president, American Locomotive Co., and public service commissioner, Poughkeepsie, N. Y.

F. J. Le Maistre, consultant, E. I. Du Pont de Nemours & Co., Wilmington, Del.

Curt G. Pfeiffer, vice president, Geo. Borgfeldt & Co., Sixteenth street and Irving Place, New York.

John R. MacArthur, vice president, MacArthur Bros., 120 Broadway, New York.

Dr. C. O. Mailloux, consulting engineer, 20 Nassau street, New York.

E. A. Warren, vice president, Universal Winding Co., 95 South street, Boston.

Samuel W. Fairchild, vice president, Fairchild Bros. & Foster, 76 Laight street, New York.

Noble Foster Hoggson, president, Hoggson Bros., Inc., 485 Fifth avenue, New York.

Joseph G. Butler Jr., director, Commercial National Bank, and vice president, Brier Hill Steel Co., Youngstown, O.

John A. Penton, president, Penton Publishing Co., Cleveland, O.

E. E. Russell, J. I. Case Threshing Machine Co., Racine, Wis.

Ambrose Swasey, president, the Warner & Swasey Co., Cleveland, O.

George Burdett Ford, member, George B. Post & Sons, 101 Park avenue, New York.

Protests

Filed by Pittsburgh Chamber of Commerce Denied

The protests of Mayor Armstrong and the Pittsburgh chamber of commerce to the war department, asking that the hearing in connection with the raising of the bridges over the Allegheny river be postponed for about 30 days, has been denied. The action of the acting secretary of war in refusing this request has stirred local city officials to an active campaign, which, if successful, will prevent the program recommended by the engineers from being carried out.

As mentioned in these columns a few days ago, the proposed improvements would include the rebuilding of six highway bridges and one railroad bridge, so as to permit a clear space of at least 350 feet between piers and allow a free height of approximately 45 feet under the spans.

The controversy is now taking the form of an argument as to whether the picturesque stern-wheeler type of river boat shall be replaced by modern twin-screw barges of steel. Considerable attention is being paid at this time to a number of experimental boats which are now in the course of construction. The Dravo Construction Co. is building an all-steel double-deck tunnel type barge, to be propelled by twin screws. The capacity of this boat will be approximately 600 tons. It develops that the Carnegie Steel Co. has placed an order for a vessel of the twin-screw propeller type, to be used in the upper Monongahela. This boat will have a length of 760 feet, a breadth of 26 feet and height above the water surface of 20 feet. The draught will be 4 feet. It is said that both of these boats are being built as an experiment and after they are in operation an opportunity will be given to determine whether or not they can successfully supplant the cumbersome stern-wheelers now in service.

An ore dock having a capacity of 10,000,000 tons of ore a season is being planned by the Duluth, Missabe & Northern railroad to take the place of dock No. 2 at Duluth. This dock is proposed to be finished before the beginning of the 1918 season. The dock will have 400 pockets with a capacity of 350 tons a pocket.

(*For complete prices see page* 442.)

Quiet at Pittsburgh

Pittsburgh, Aug. 28.—The labor situation in the Pittsburgh district is comparatively quiet. With the exception of the foundries, industries are not suffering from labor troubles, except that there is a scarcity of workmen of all kinds. The molders' strike continues in full force, but the effect upon the production of the foundries is fast diminishing, notwithstanding the fact that many of the plants are still picketed.

In many cases the employers have been able to fill the ranks of the strikers with men secured from other districts, and in these cases the plants are operating at practically full capacity. A number of concerns, however, have been slow to accept the situation at its face value and managers of these establishments have been unable to raise their production above 90 per cent capacity. A man who has studied local conditions quite thoroughly is authority for the statement that approximately one-half of the foundries are now working at full capacity, while the other half are operating at 90 per cent.

Repairs Damaged Tanks

The Johnson & Barry Steel Co., North Birmingham, Ala., recently completed an unusual repair job on 12 oil tanks belonging to the Texas Oil Co. The tanks, 30 feet long and 10 feet in diameter, were a mass of burned and melted iron, punctured in various places by the force of explosions during a fire. The rivets were removed, the damaged plates straightened and patched where torn, and the tanks reconstructed. Rivet hammers, busters, drills and compressors made by the Chicago Pneumatic Tool Co. were used.

A company has been registered in Australia, says the *Ironmonger*, London, with a capital of £1,000,000, for the electrolytic production of zinc and the manufacture of spelter. Works are to be built in Tasmania, and negotiations are in hand for the supply of power from the new hydro-electric plant at Great Lake. The articles of association provide that the company shall remain entirely under British control.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

PLIMON H. DUDLEY, consulting engineer on rails, tires and structural steel for the New York Central Lines since 1878, recently published some important deductions regarding the causes of rail failures, which have been received with widespread interest in iron and steel circles. This material, which appeared on pages 331 and 332 of the Aug. 17 issue of *The Iron Trade Review*, has been widely reprinted. Dr. Dudley, who is one of the country's foremost steel investigators, believes that interior transverse fissures in rails may be eliminated by reheating the bloom and also by revising the methods of straightening nearly cold rails in gag presses.

Arthur E. Woolsey has been appointed manager of the plant of the Anniston Steel Co., Anniston, Ala. Mr. Woolsey was formerly manager of the Tata Iron & Steel Co.'s steel works at Sakchi, India.

Robert MacDonald, formerly president of the Associated Foundry Foremen, and manager of the plant of Samuel L. Moore & Sons Co., Elizabethport, N. J., has been appointed assistant general sales agent of the Lehigh Coke Co., South Bethlehem, Pa.

Theodore L. Dodd for ten years secretary of McClernan & Co. has resigned to go into business on his own account and has opened offices at 339 Railway Exchange building, Chicago. He will handle butt and lap welded tubes and brass and copper tubing, among other things.

W. M. Lorentz, head of the traffic department of the Cambria Steel Co. at Johnstown, Pa., has been transferred to Philadelphia, where he will become assistant to Traffic Manager H. C. Crawford. William Lebzelter, formerly assistant to Mr. Lorentz, will be in charge of the Johnstown traffic office.

W. S. Stothoff has been appointed general superintendent of Wm. Wharton Jr. & Co., Inc., Easton, Pa., and the Tioga Steel & Iron Co., Philadelphia, in charge of plants and manufacturing. He was formerly in charge of sales of the Taylor-Wharton Iron & Steel Co., the parent company, at High Bridge, N. J.

R. D. Chapman has been appointed general sales manager of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., Wm. Wharton Jr. & Co., Inc., Easton, Pa., and Tioga Steel & Iron Co., Philadelphia. C. B. Andrews has been appointed sales manager of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

William L. Diemer Jr., for many years secretary of the Gendron Wheel Co., Toledo, has resigned and purchased the controling interest in the National Wheel Co., of Perrysburg. Mr. Diemer has been connected with the Gendron Wheel Co.

PLIMON H. DUDLEY

for 23 years, holding important official positions. He expects to expand the new plant, which manufactures bicycles and baby carriages.

August Mann, manager of the Farrell Works of the American Steel & Wire Co., near Sharon, Pa., has been made manager of the plant of the United States Steel Corporation at Donora, Pa. Mr. Mann came to the Farrell Works three years ago from Anderson, Ind., to succeed John O'Keefe. John McHugh, assistant manager of the Farrell Works, will act in the capacity of manager until a successor to Mr. Mann is named.

The Crocker-Wheeler Co., Ampere, N. J., announces that its San Francisco district office, W. K. Brown, district manager, has been removed from the Crossley building, 619 Mission street, to the ground floor of 87 New Montgomery street. A large assortment of motors, generators and transformers will be carried in stock for the convenience of buyers of electrical equipment on the Pacific coast.

F. C. Gedge, late manager of the wire mills of the American Steel & Wire Co. in the Chicago district, who died July 28, has been succeeded by W. L. Hayes, formerly assistant manager of the Cleveland district. W. C. Stone, formerly assistant manager of the Chicago district, succeeds Mr. Hayes at Cleveland. George W. Sells, formerly superintendent of the North works, at Worcester, Mass., has been made assistant manager of the Chicago district. E. H. Broden, formerly superintendent of the Braddock, Pa., works, has been made superintendent of the Rankin, Pa., works, succeeding H. S. White, who is absent from duty on account of ill health. F. B. Hill, formerly superintendent of the Donora wire works, succeeds Mr. Broden as superintendent of the Braddock works. F. F. Gage, formerly assistant superintendent of the Rankin works, has been appointed superintendent of the Donora works, succeeding Mr. Hill.

New Book on Accounting

"Principles of Accounting," by Stephen Gilman, has been published by LaSalle Extension University, Chicago.

L. H. Wintermute, accountant, Cleveland, who has examined the book carefully, says:

"This is a text book of unusual merit and explains in a very clear manner some of the things that are seldom covered in the ordinary books on accounting. It will be easily understood by business men and bookkeepers, even those who are not thoroughly posted on technical terms. It explains in plain language many of the points which other writers take for granted on the assumption that the reader already understands them.

"In many places where it parallels the work of other authors, the explanations and descriptions are especially valuable because the subject is put before the reader in a new and possibly clearer light. It covers practically the entire field of general accounting."

Foreign Ferro

Is Still a Very Uncertain Factor Owing to Failure to Grant Licenses

New York, Aug. 29.—English makers of ferro-manganese continue to find it difficult to secure licenses for shipping this material to this country. During the past week, one license has been granted to a concern whose last previous shipment to this country had gone toward in July. As previously stated, only one license was granted for August shipment. As a result of this difficulty in securing foreign supplies, it is considered as not unlikely that this market again is headed for another scarcity and some sellers freely predict higher prices. Up to the present time, prices have undergone no change. The market is quoted nominally at $175 seaboard on spot and future shipment, but this level easily can be shaded on domestic and possibly foreign material. Domestic electrolytic ferro-manganese was sold last week at $167 delivered, and may be quoted at approximately $160 to $170, delivered at any point. Inquiries in the market involve about 1,000 tons. The market on spiegeleisen is quiet and unchanged at $45 to $50, furnace, for 20 per cent material.

Inactive at Pittsburgh

Pittsburgh, Aug. 29.—The demand for steel making alloys in the Pittsburgh district is comparatively weak and no sales, except those involving very small tonnages, have been noted for some time. Several carload lots of ferro-manganese have been disposed of at the prevailing price, $175. Fifty per cent ferro-silicon is still demanding from $83 to $85 and bessemer ferro-silicon, although extremely inactive, is quoted at $31 for 9 to 10 per cent grades; $32 for 10 to 11 per cent; $33 for 11 to 12 per cent and $34 for 12 to 13 per cent.

Nuts and Bolts

Are in Very Active Demand — Some Plants Booked into 1917

Pittsburgh, Aug. 29.—The new prices of bolts and nuts which were announced last week are now in effect and so far as can be seen, the demand for these products is as strong as before the advance was made. Manufacturers in this district claim that their plants are filled with orders which will take them well into 1917 and apparently the advanced prices have not in any way diminished the call for these products. Rivets continue to be in strong demand and fair-sized orders are reported daily.

Cold Rolled Strip Steel

Pittsburgh, Aug. 29.—The production of cold rolled strip steel is now said to be exceeding the demand by a slight margin. The market is fairly active and sales during the past week indicate that the price ranges between 6c and 6.50c, base. Most of the transactions now being noted have involved comparatively light tonnages, showing that most of the large consumers have covered for their last half requirements. The sales now being negotiated represent the purchases of small independent consumers, who have not yet covered for their needs. Less than five per cent of the strip steel now being sold is for direct foreign consumption.

Wire Products

Are in Active Demand — Especially All Kinds of Nails

Pittsburgh, Aug. 29.—The activity in all kinds of business has been reflected in the demand for wire and practically all wire products, with the possible exception of fencing, are in strong demand. Although the inquiries from foreign countries are encouraging, there is a sufficient demand from domestic sources to keep the mills actively engaged for some time to come. All kinds of nails are unusually active and considerable tonnage of plain wire is being bought. Prices are quoted at the same levels previously reported.

Jens Jensen, 1634 Mozart street, Chicago, has taken the general contract for erecting a large iron, steel and brass foundry and core building for the Stewart-Warner Speedometer Co., Chicago, at the Warner works in Beloit, Wis. The iron foundry will be 122 x 530 feet and the core shop 70 x 80 feet.

The Non-Ferrous Metals

Copper Lead Spelter Tin

Prices on all metals, with the exception of copper, went to lower levels during the month of August. According to averages compiled up to and including Aug. 29, antimony again will show the greatest depreciation in price, the average for this metal being 13.142c, as compared with 14.761c in July. Spelter, aluminum and lead follow in order, dropping off 0.568c, 0.429c and 0.274c, respectively. Tin showed but little change, its average for August being only 0.02c under that of July. Copper, the only metal to advance during the month, averaged 27.375c (this for electrolytic), a gain of 1.758c over July. A comparative statement, including the high and low prices for the month follows:

	High.	Low.	Average for Aug.	Aver. for July.
Copper	28.12½	26.62½	27.375	25.607
Tin	39.50	37.75	38.565	38.591
Lead	6.50	6.00	6.273	6.547
*Spelter	9.87½	8.12½	8.949	9.517
Aluminum	61.00	58.50	58.904	59.333
Antimony	16.00	10.50	13.142	14.761

New York base except where otherwise specified.
*St. Louis.

The New York Markets

New York, Aug. 29.—The metal markets reflect much less activity than was noted a week or two ago. The most active metal continues to be copper, for which there still is a good demand. Sales of electrolytic, lake and casting copper are reported in good volume and prices are slightly higher and firm. Electrolytic is quoted as follows: For prompt, 28c to 28.25c cash; September, 28c cash; October, 27.75c cash; November and December, 27.25c cash; lake copper is quoted as follows: Prompt and September, 27.75c to 28.25c cash; October, 27.75c cash; November and December, 27.25c cash. Ordinary casting copper is quoted at 25c to 25.25c for prompt and September.

Demand for spelter is at a minimum and prices have sagged off slightly under the pressure of second-hand offerings. Producers, however, are firm in their views due to the large volume they lately have taken. Prime western spelter is quoted as follows: 8.87½c to 9c, St. Louis; September, 8.75c to 8.87½c; last quarter, 8.62½c to 8.75c; brass special for prompt shipment is quoted at 9.50c to 10c, St. Louis. A good sized foreign business involving chiefly high grade spelter was done last week.

The lead market is strong, due to the sold-up condition of the producers. A fair business continued to be done last week but the market now is quiet and the only development of interest is a demand from Japan and Canada for fair sized tonnages. The outside market is quoted at 6.60c to 6.65c St. Louis and 6.75c New York. The American Smelting & Refining Co. continues to quote 6.50c New York and 6.42½c, St. Louis.

A better demand for aluminum has served to emphasize the scarcity of this metal. Prices on prompt carloads at the outside now are higher as follows: No. 1 virgin, 60 to 62c; No. 1 re-melted, 58c to 60c; No. 12 alloy, 46c to 48c.

Sellers of tin report that there are indications that the British admiralty again may curtail exports of the metal to this country. It again is becoming difficult to secure licenses for shipping both from the Straits and from Great Britain to this country. As a result prices are hardening slightly. Tin for spot and September shipment now is quoted at 39.37½c to 39.50c. October is quoted at about 39.25c, and November and December at about 39c.

Demand for antimony has been very dull during the week and has involved only small lots of spot which have been obtainable at around 13.50c to 14c, duty paid, New York. The Wah Chang Mining & Smelting Co. asks 15c to 16c, duty paid, on spot and is quoting on nothing larger than 5-ton lots due to the heavy sales it made recently. Other importers are quoting about 15c to 16c, duty paid.

(*For complete prices see page* 442.)

Production of Automobile Cylinders

THE REFINEMENTS of molding and the details of casting as practiced at a modern foundry are discussed in the accompanying article—Light work of intricate design is being turned out successfully—The advent of small cars has further complicated the problems which are presented to the foundryman

"NOTHING succeeds like success," is an old saw which can be applied to the automobile cylinder foundry business equally as well as to the gasoline industry fostered by the oil barons. Since the advent of the motor car, foundry practice, particularly light work, has been revolutionized and castings of such intricate design are being made successfully today, which were considered impossible of production 15 years ago. No branch of casting manufacture has been as inviting to the foundryman as that afforded by the automobile and motor truck cylinder, nor is any class of work surrounded with more pitfalls which have proved the undoing of many who have ventured into this difficult and exacting line of endeavor. To the designer of motor cars, nothing, apparently, is impossible of accomplishment in the foundry, and this has resulted in intricate models and reduced thickness of wall section that involve the greatest refinements of the founder's art. The demand for lighter cars has forced a reduction in the weight of the power plant and every casting entering into the construction of the engine has been pared to its lowest allowable thickness. Therefore, it is not surprising that this work has developed into a specialty and many shops have been built and equipped to produce these castings to the exclusion of all other kinds of foundry work. On many jobs, cylinder foundrymen refuse to quote on the pound basis, fixing a price for the casting that will be commensurate with the work involved and the high losses sustained. Reduced to the pound basis, the prices paid for certain types of cylinder castings are enormous, yet from the standpoint of the foundryman they no more than cover the risk of doing this class of work. Losses of 40 per cent, in some shops, are not at all unusual, to which must be added the rejections by the buyer.

FIG. 1—ONE OF THE CYLINDER MOLDING FLOORS OF THE ALLYNE-RYAN PLANT, SHOWING THE TWO LARGE CUPOLAS WHICH MELT 110 TONS OF IRON DAILY

Less than four years ago the plant of the Allyne-Ryan foundry Co. was established in Cleveland for the purpose of specializing in motor car castings. The foundry was designed and equipped solely for this class of work and some of its remarkable achievements were described

FIG. 2—A FLOOR OF SIX-CYLINDER MOLDS, SHOWING THE MOLDING MACHINE AT THE LEFT

in *The Foundry*, July, 1913. Since the publication of this article, the plant has been greatly increased in size and the melting capacity has been more than doubled. Another cupola, 102 inches in diameter, has been installed, and the equipment has been added to, to keep pace with the growth of the melt. The improvement in practice likewise has made similar progress and the methods pursued permit of maintaining an average loss of only 8 per cent. A bonus of 10 per cent of their salaries is paid to the shop executives for keeping the average losses down to 8 per cent or less, and not a month has passed in which these bonuses were not paid.

In mastering the difficulties of automobile cylinder work, many problems had to be solved and the wonderful success attained by this plant is attributed to the painstaking attention given to every detail of the operations. For practically every job special rigging is provided, making it impossible for the coremakers and molders to go wrong. Molding machines also play a conspicuous part in the success of this shop, a total of 107 being in use in the foundry and the core department, including the Adams, Berkshire, International, Osborn and Pridmore types. Coupled with the proper rigging and equipment is system, every operation apparently being timed to eliminate delays and lost effort. The melt from two cupolas, 78 and 102 inches in diameter, respectively, now averages 110 tons daily, of which approximately 40 per cent is return scrap in the form of gates, runners and risers. Semi-steel mixtures are employed for all of the castings, varying from 8 to 12 per cent steel content.

In these days of labor unrest, the wages earned by the molders in this

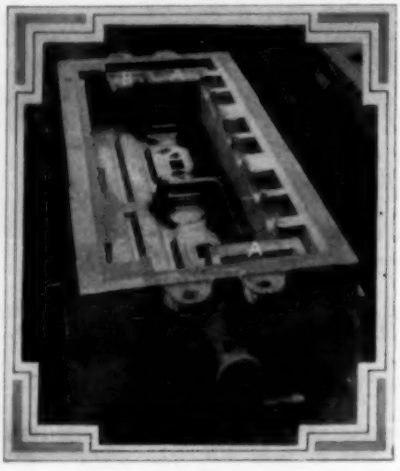


FIG. 3—DRAG HALF OF HUDSON SIX-CYLINDER MOLD SHOWING METHOD OF GATING

shop, on the piecework basis, will prove a revelation to most foundrymen. Operating molding machines in gangs, consisting of four or five molders and two helpers, the molders are able to earn from $135 to $154 in a 12-day working period. It is doubtful if these figures even can be approached in any casting plant and they reflect the ingenuity of the management in furnishing the proper equipment, rather than the extraordinary ability of the individual operator. When the piecework price originally was established, the output per floor did not measure up to the totals of today, but notwithstanding the improved facilities afforded and the labor-saving equipment installed, making the bigger output possible, the rate has never been changed. The machine operators never work in excess of nine hours per day and frequently their floors are up in eight hours. The gangs engaged on cylinder work make the molds only, not being required to cut-over and temper the sand, pour-off or shake-out. Their output, therefore, is much larger than if they were compelled to perform the other operations customarily considered a part of the molder's duties. Even the work of the pouring gangs has been specialized, one gang carrying the iron to the molds while the other gang pours off. This arrangement has proved exceedingly satisfactory, since the men who constantly are engaged in pouring-off, became more proficient than if they were compelled to perform several operations.

The molders report for work at about 5 o'clock in the morning, and invariably ring out between 2.30 and 3:15 p. m., practically 30 minutes of this period being required for washing up. As far

FIG. 4—ASSEMBLED CORES FOR SIX-CYLINDER MOLD WITH CORE FRAME AT THE RIGHT
FIG. 5—MOLDERS LOWERING ASSEMBLED SIX-CYLINDER CORES INTO A MOLD
FIG. 6—SKIM GATES USED IN THE SIX-CYLINDER MOLD

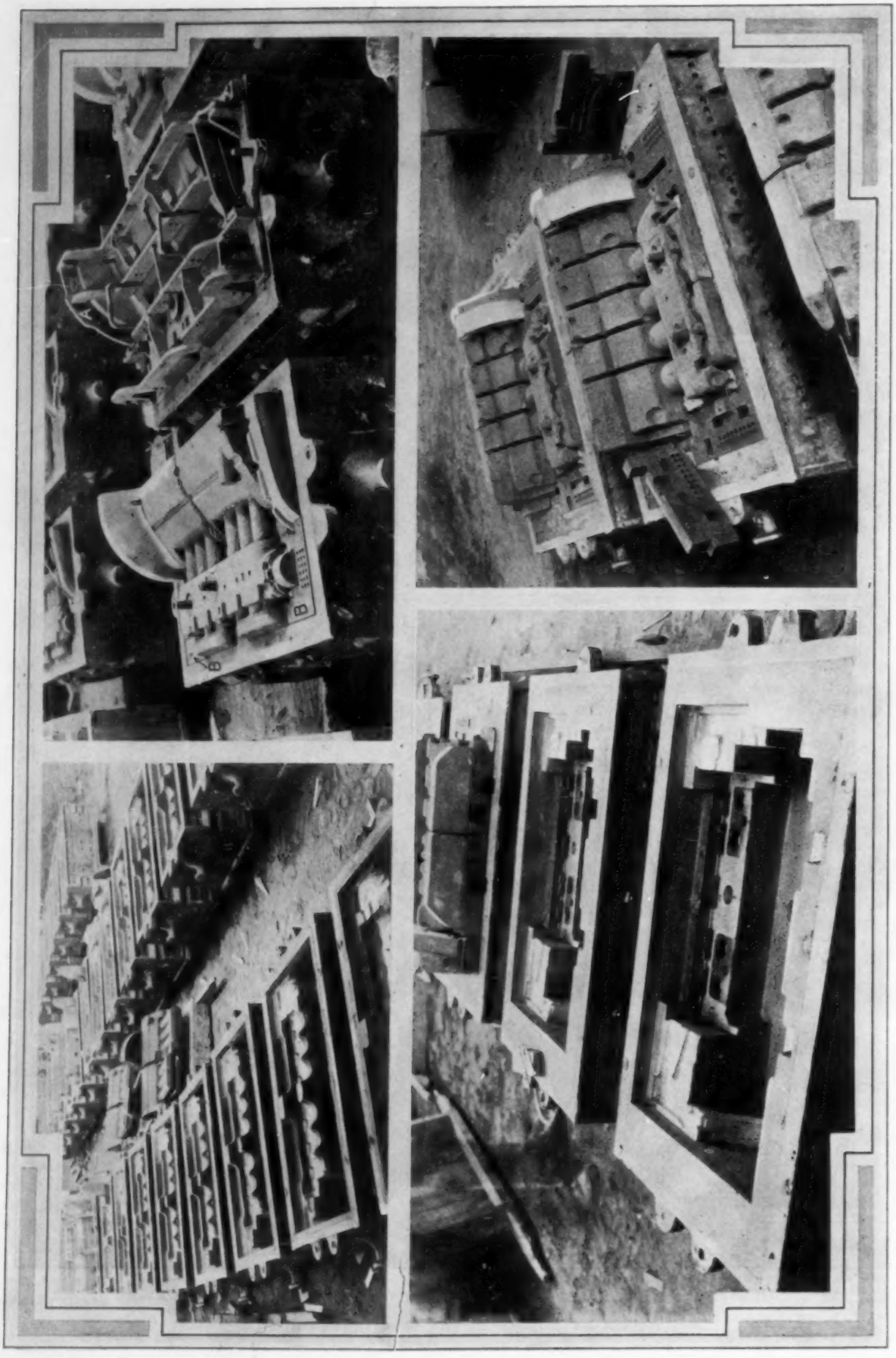


FIG. 7—DRAG HALVES OF ANOTHER TYPE OF SIX-CYLINDER MOLDS, SHOWING THE METHOD OF GATING

FIG. 8—SKIM GATES IN THE SIX-CYLINDER MOLD, FIG. 7, AND GAGE TO TRY THE ACCURATE SETTING OF THE CORES

FIG. 9—HOW THE DRAG HALVES OF AN EIGHT-CYLINDER CASTING MADE FOUR *EN BLOC*, ARE GATED

FIG. 10—SKIM GATES USED IN THE MOLDS, FIG. 9

as possible, the large jar-ramming, roll-over, pattern-drawing molding machines are operated in pairs, the drag halves of the molds first being made, followed by the copes. Two molding gangs, operating on one type of cylinder castings, with the aid of a pair of molding machines can put up from 70 to 75 molds daily. Molding by hand, one cylinder mold is considered a day's work for one man. A force of 12 to 13 men constitutes one of these double gangs of which four are laborers, and the output per molder by the use of machines and the system in vogue, has been increased eight-fold. The first iron is tapped at about 10:30 a. m. and melting continues until 5:30 p. m. when bottom is dropped.

pose of producing clean castings. All of the cylinders are molded in green sand, although the tendency recently, owing to the reduced thickness of the wall section of these castings, has been toward the use of dry sand molds, many shops having resumed this practice, after a trial with green sand molding.

One of the most intricate parts designed by the automobile engineers to satisfy the high speed craze, is the six-cylinder casting, for the Hudson motor car. It involves an unusually large amount of core work and many of the foundrymen who have tried this job have found it to be very difficult to run. Proper gating was the problem

gates again before entering the runner leading to the gates in the mold. In addition to the gates, clearly shown, four horn gates help to distribute the metal. Fig. 6 clearly illustrates the skim gates, this view showing several drags with the cores in position. The metal strikes the sand at *A*, flows through the openings *B*, into the basin, *A*, Fig. 3. When this basin is filled the metal flows out of the opening *C*, Fig. 6, and over the openings in section *D* of the skim gate. From this gate it passes through *B*, Fig. 3, into the mold. One of the skim grate cores, ready to be placed in the mold, is shown at *E*, Fig. 6. The opening *C*, through which the metal rises to

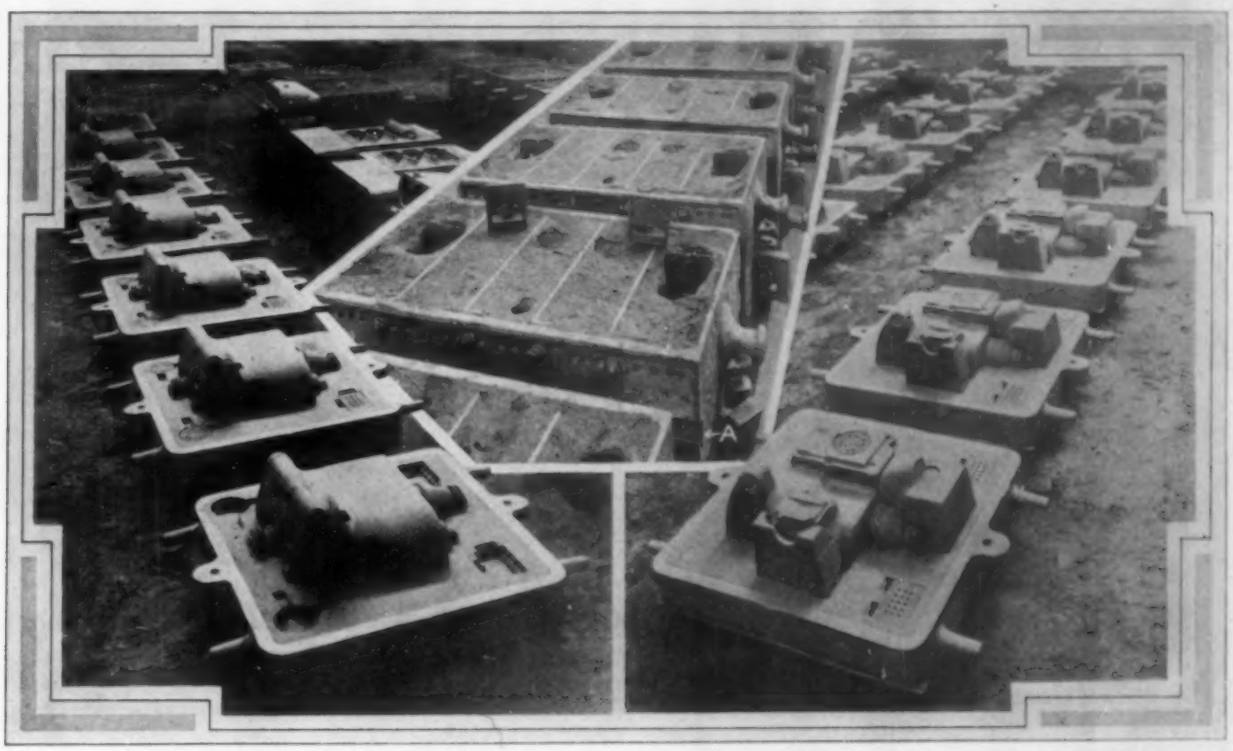


FIG. 12—SKIM GATES USED IN THE POURING BASINS

FIG. 11—SKIM GATES FOR TRANSMISSION CASE MOLDS. TWO OF THESE ARE ROUND AND TWO RECTANGULAR

FIG. 13—THREE SKIM GATES IN ANOTHER TRANSMISSION CASE MOLD

After the molders leave their floors the castings are shaken-out by a separate gang and at night the sand is tempered and cut-over, two machines furnished by the Sand Mixing Machine Co., New York, being employed for this purpose.

Extensive Use of Skim Gates

One of the features of the practice of this shop is the great care exercised to get clean iron into the molds. Skim gates, in the form of dry sand cores, are used not only at the entrances to the runners, but also in the pouring basins. In many of the molds, double skim gates, in addition to the skimming of the metal in the pouring basin, are the precautions resorted to for the pur-

that had to be solved, and after considerable experimenting, these castings are being made successfully in the Allyne-Ryan shop. Here again the proper mounting of the pattern and adequate rigging was a big factor in the success of the work, $3,000 having been expended before the pattern was put into the sand.

The drag half of the Hudson six-cylinder mold is shown in Fig. 3, with only one L-shaped core in position. The metal enters the mold at either end through skim gates placed over *A*, these two depressions forming reservoirs, and when it rises above the top of the end sand wall it passes over skim

pass through the openings in section *D* is made in the dry sand core constituting the skim gate. The use of skim gates is the pouring basins of cylinder molds is illustrated in Fig. 12. In the two molds in the foreground the gates have been placed in position, the metal being poured into the basins at one side, flowing through the openings in the gates, thereby preventing slag from entering the molds with the metal. Front and reverse sides of two of the skim gates, which are dry sand cores, are shown on top of one of the molds. One of the features of pouring the metal is the method of supporting one end of the

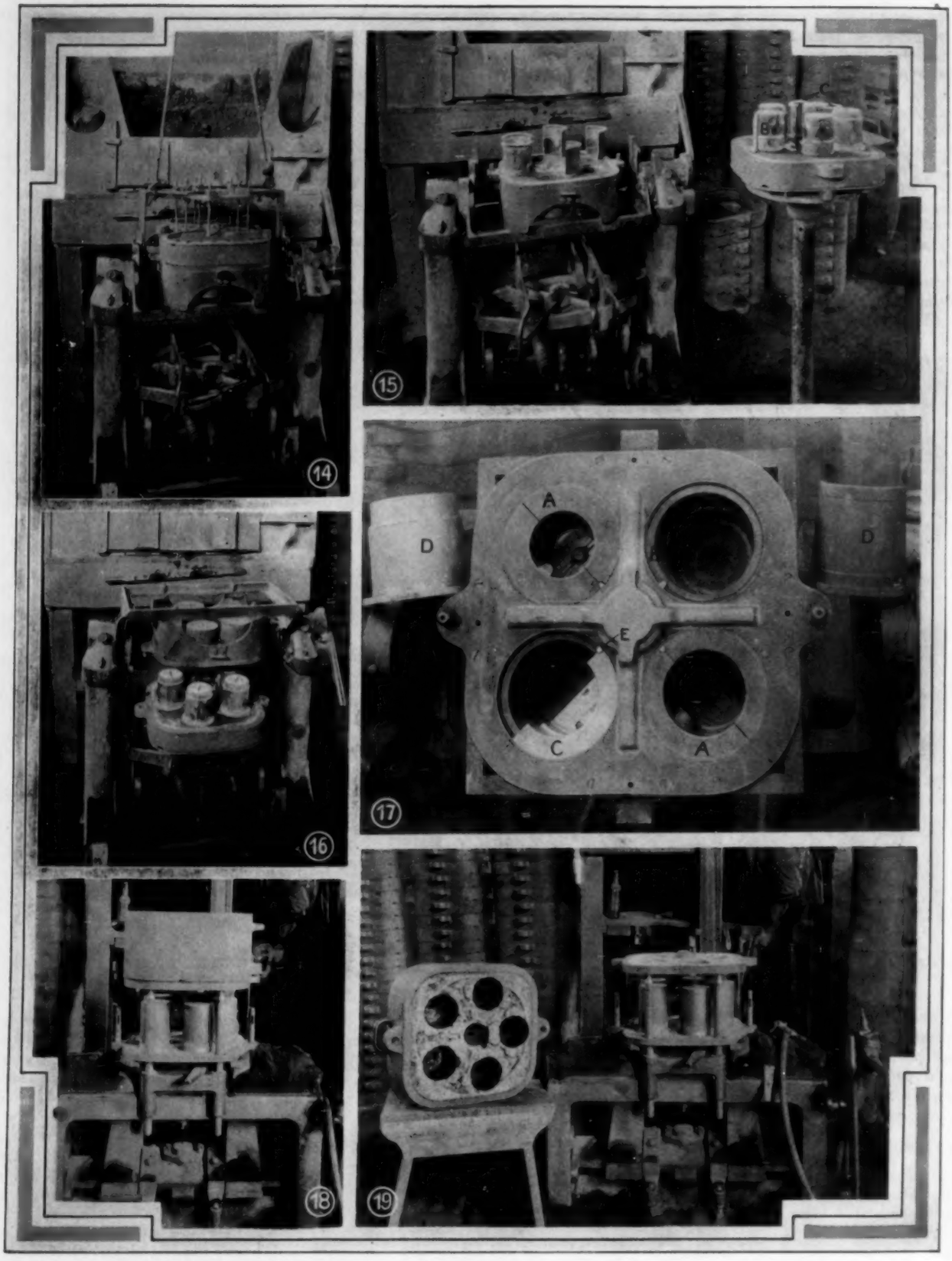


FIG. 14—VENTING DEVICE FOR GREEN SAND PISTON CORES; FIG. 15—PISTON MOLDING MACHINE WITH DRAG ON THE STAND AT THE RIGHT; FIG. 16—DRAG PISTON MOLD LOWERED AWAY FROM THE PATTERN; FIG. 17—PISTON PATTERN PLATE SHOWING THE SHELLS FOR THE GREEN SAND CORES; FIG. 18—COPE MACHINE FOR PISTONS WITH MOLD STRIPPED AWAY FROM THE PATTERNS; FIG. 19—COPE LIFTED OFF AND READY TO CLOSE OVER THE DRAG

ladle shank while the flow of the metal into the pouring basin is being regulated. At *A*, Fig. 12, is shown a dovetail at the end of the cast iron flask into which a supporting arm is inserted for holding the ladle shank. As the pouring gang passes from mold to mold, this arm is removed ready for insertion in the next flask. All of the cylinder mold flasks are equipped in this way, the men not only being relieved of the weight of the iron in the ladle, but it also insures the flow of a steady stream of metal into the mold. The pouring of cylinder molds by the use of bull ladles recently has been introduced and has proved successful. Two ladles are swung from a traveling crane on a chain divided by a separator, each ladle pouring iron into the pouring basins of the cylinder mold. The capacity of the two ladles is sufficient to cast 10 molds.

FIG. 20—CORE BENCH ON WHICH SIX-CYLINDER CORES ARE ASSEMBLED

The cores for all of the cylinder molds are assembled in the core department, where they are machined and pasted together ready for placing in the molds when delivered to the various floors. At *A*, Fig. 4, are shown the assembled cores for the Hudson six-cylinder casting on the carrier on which they are brought from the core shop. The only core work that is required of the molder is the insertion of the six barrel cores; *B* is a view of the other side of the assembled cores and shows the many intricate ports and passages; *C*, Fig. 4, is the frame in which the assembled cores are placed for the insertion of the barrel cores; it also permits of placing the wires around the barrel cores and adjusting the end supporting handles for carrying the core and lowering it into the mold. The six wires are bent into a half circle at one end and support the long projecting ends of the barrel cores. In Fig. 5, two molders are lowering one of the assembled cores into the mold. After the core is in position, the wires are released from the cross bar permitting the removal of the handles, while the wires are removed from the barrel cores by a slight turn. After the cores are in position and before the mold is closed with the cope, the cores are tried with a gage for metal thickness which does not exceed 5/32-inch in the water jackets. One of these metal gages, over the cores in another type of six-cylinder mold, is shown at *A*, Fig. 8. In addition to the bearing points on the machined parting of the flask, the gage has bearings on the core prints, but elsewhere, openings the thickness of the metal must be provided between the core and the surface of the gage. The cores of every cylinder mold are gaged in this way, which is the last precautionary step taken to insure a uniform metal thickness in the castings. All of the gages are provided with handles and are skeleton frames to reduce their weight. Similar gages, as well as templets, are used in the core department, where the cores are assembled.

It was previously stated that the cylinder cores are machined, and that is the term which should be applied to the operations performed in obtaining true surfaces. Fig. 21 shows two jigs designed especially for machining cores for the Hudson six-cylinder casting. In the machine in the foreground is the base core after filing and rolling over in the frame. In the frame in the background are the center jacket and cap cores assembled with the operator filing the surfaces to get true bearings. After all of the surfaces have been machined, the cover is lowered and clamped, the frame rolled-over, and the operation repeated on the other side. Not only are true bearing surfaces obtained in this way, but the accurate assembling of these two parts of the cores is insured. One of the files used for this work is illustrated in the foreground at *A*.

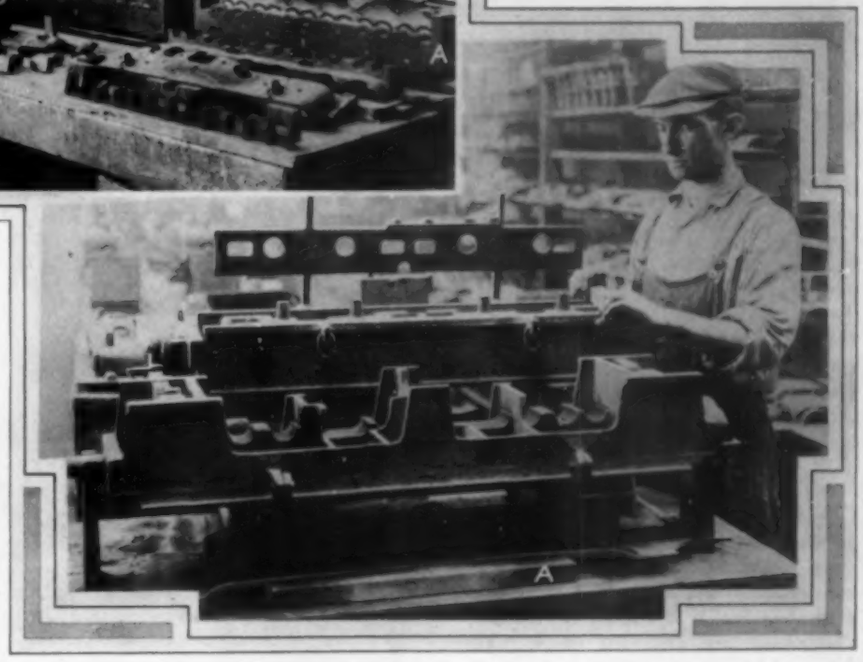


FIG. 21—ROLL-OVER FRAMES ON WHICH CORES ARE ACCURATELY MACHINED

After the cores have been machined they are stored on racks, illustrated in Fig. 20, to be assembled on tables, one of which is shown in the foreground. All of the cores are assembled in the machined base core, shown at *A*; *B*, *B*, *B*, *B*, are four of the Hudson six-cylinder cores assembled and on the table in the foreground are the numerous parts which are pasted together. Here are shown respectively, the cap, cope and

FIG. 22—A FLOOR OF CYLINDER MOLDS AT 11 A. M.

center jacket cores, the intake and exhaust cores, small port cores, the yoke and the end cores. All of these parts are assembled and pasted together, and when the foundry is crowding the core department, the assembled cores are placed in an oven to effect the rapid drying of the paste. All of the cylinder cores are machined and assembled in this manner, requiring no further work on the part of the molder than the insertion of the barrel cores and lowering into the mold. Nearly 400 men are employed in the Allyne-Ryan core department and the size of the output is reflected by the core oil consumption which averages eight barrels daily, furnished by the Werner G. Smith Co., Cleveland.

One of the Cylinder Floors

A view of one section of the Hudson six-cylinder molding floor is illustrated in Fig. 2. The large, Osborn, jar-ramming, roll-over, pattern-drawing molding machine on which the copes and drags are made, is shown at the left. The molds are deposited on a buggy from which they are removed to the floor by the air hoist. In the center bay, the Osborn cylinder molding machines are served by four overhead, electric traveling cranes which are constantly engaged in removing molds from the buggies to the floors. It is the intention to operate this job with two molding machines with an output of 100 cylinder molds daily. A handy core rack is shown suspended from the wall in the background. Here the barrel and gate cores are neatly piled, convenient for use. In the foreground, at *A* and *B*, are two cast iron bottom boards which insure level bearings for the flasks and will not warp or burn-out; *B* is the reverse side of the board showing the four cored supports and the entire board is cored with numerous openings for lightening purposes. The progress of the cylinder molding work is well-illustrated in this view. The newly-made drags are in a row on the floor near the machines, and in the background, as well as the foreground of the row at the right, the cores have been placed and the copes have been closed-over a number of drags. Since the pouring of the molds commences at about 10:30 a. m. the molds are clamped ready for the pouring gangs, while the molding operations are carried on, the same as in a continuous foundry.

The method of gating the molds for the Northway, six-cylinder casting is illustrated in Fig. 7. It will be noted that the metal flows through three gates on one side and two on the other. The skim gates for this mold are shown at *B*, Fig. 8. The cylinder castings for the Olds "Eight" are cast in halves, four *en bloc*, the drag halves of two of these molds, illustrating the method of gating, being shown in Fig. 9. The metal enters the mold through three gates on one side and four on the other. The skim gates for these molds are shown in Fig. 10. The gates are arranged with openings to permit the slag to rise and to prevent it from entering the mold with the metal.

As previously pointed out, skim gates are used in all the molds made in the shop, and Figs. 11 and 13 illustrate their employment in transmission case molds. In the foreground in Fig. 11, the gates in the drag half of the mold are clearly shown and in the remaining molds the skim gates have been placed in position. At the left are two round gates and the two gates at the right in each mold are rectangular. In the transmission gate molds, illustrated in Fig. 13, three skim gates are used, one circular and two rectangular.

A floor of molds for the Olds "Eight", cast four *en bloc*, is illustrated in Fig. 1, with the two cupolas in the background. At the side of the outside row of molds are shown three core carriers on each of which is placed all of the cores required for one mold. The metal is distributed throughout the shop by an electric trolley system, ladles being delivered to the most distant floor in one minute. Since all of the work is extremely thin, hot iron is essential. The fuel consumption, therefore, is

FIG. 23—THE WELL-EQUIPPED CLEANING ROOM

heavy, and in spite of the big melt and the almost continuous operation, the melting ratio is never better than 1 to 4. This may seem an extravagant use of coke, but it has been figured that avoiding the loss of one cylinder casting, because of dull iron, more than compensates for the consumption of several tons of coke, and no chances are taken by experimenting with high melting ratios since hot iron is a known necessity. The small, air-cooled cylinder casting illustrated at the left and at the top of Fig. 1, is one of a large number made for aeroplane motors. The air-cooling fins are only 1/16-inch thick and

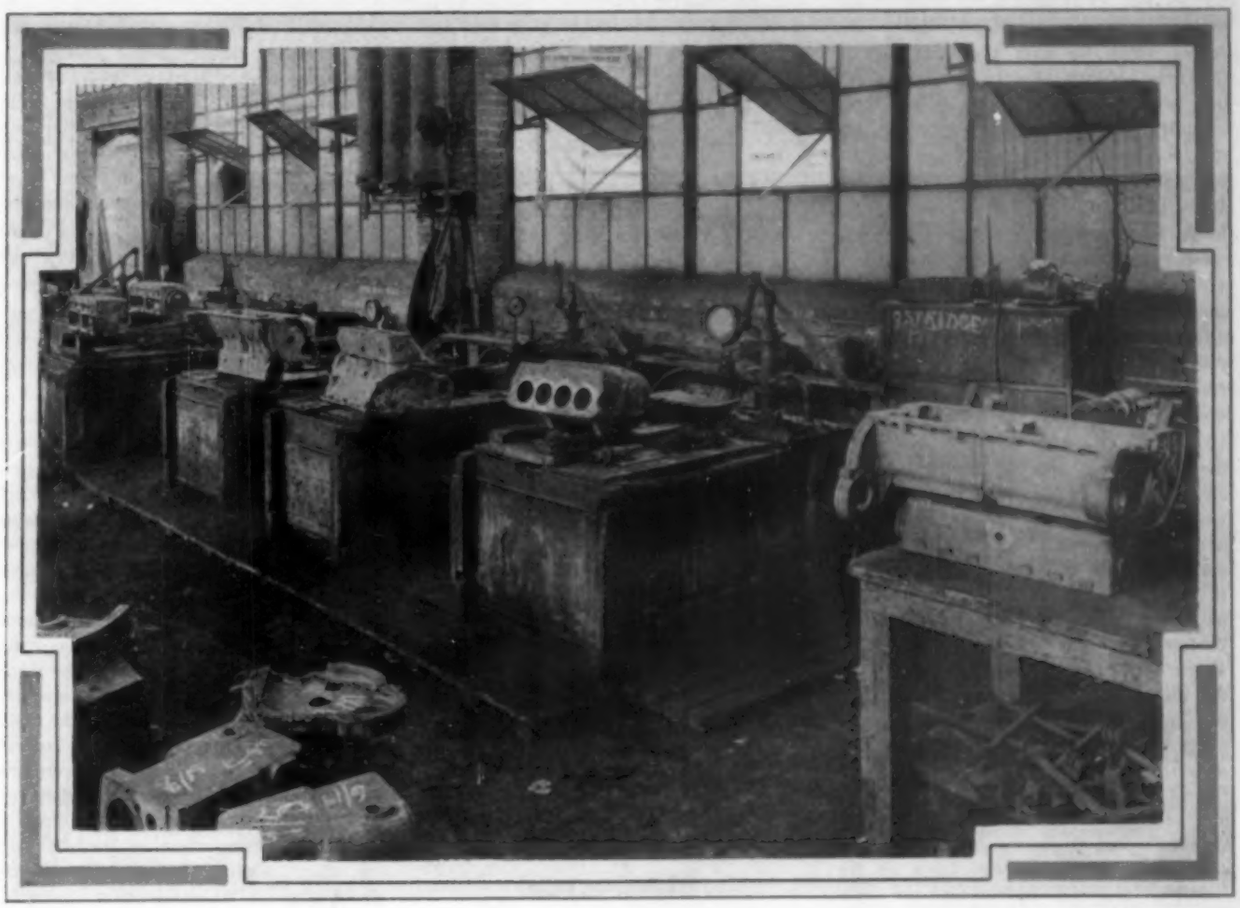


FIG. 24—THE TESTING BENCHES ON WHICH THE CYLINDER CASTINGS ARE SUBJECTED TO 100 POUNDS WATER PRESSURE

the cleaned casting weighs only 9 pounds. These castings were poured in dry sand molds. Fig. 22 shows another floor of cylinder molds, the illustration representing the progress of the work to 11 a. m.

In the Allyne-Ryan foundry it formerly was the practice to make piston molds by the use of dry sand cores and this method is followed in many shops today. It was realized that the molding cost could be reduced considerably with green sand cores and special rigging and machines were devised to eliminate the use of dry sand cores. The machine on which the drags are made is shown in Fig. 14, with the special venting device partially withdrawn after venting the green sand cores. This venting equipment is an important feature of the piston molding outfit. This mold, as will be shown subsequently, contains five pistons and each core has two vents. Ten wires for venting the five cores are supported by a counterbalanced frame, and after the mold is rammed and the bottom-board placed, the venting frame is lowered until it contacts with the cast iron bottom board. The frame is lowered accurately by V-guides on both the frame and the machine. The wires are carefully adjusted to vent the cores to within ⅛-inch from the surface of the piston heads. The mold is rammed by hand.

After clamping, the mold is rolled over and lowered away from the pattern, as shown in Fig. 16, and is ready to be lifted off to be placed on the stand at the right of Fig. 15. Since the pistons contain bosses extending into the cores, it is impossible to draw the patterns straight and this difficulty has been overcome by the use of semi-circular shells which are withdrawn sideways by the molder after the drag of the piston mold has been placed on the stand. These shells are shown on top of the pattern in Fig. 15, and partially in place and withdrawn from the mold on the stand. From the core at *A*, the shells have been removed, but only one-half of the shell has been withdrawn from the core *B*. At *C* two shells have been lifted away from the core, but are still in place on the mold. The top of the stand rotates to enable the molder to turn the mold for the removal of the shells without changing his position. Fig. 16 shows all of the shells in place on the green sand cores.

The drag half of a pattern plate containing four piston cores is illustrated in Fig. 17. At *A*, the semi-circular shells are in molding position in the mold, while from the opening, *B*, they have been withdrawn. At *C*, one of the semi-circular shells is in position and *D*, *D*, show the exterior outlines of two shells. Only one pattern plate is required for each machine, and by varying the inside diameters of the shells, pistons of any size within the range of the pattern plate can be made. Each size of piston, of course, requires a set of shells, but one pattern plate serves for all. Each pair of semi-circular shells is numbered from 1 to 4, or 1 to 5, to insure the fitting together of the shells

for each core. The shells fit loosely in the pattern plate, remaining in position when the mold is lowered away from the pattern, and are prevented from rotating by the small lug, *E*. The pattern plate also clearly illustrates the method of gating. The copes are made on a jar-ramming, stripping plate, molding machine, shown in Figs. 18 and 19. After ramming, the stripping plate with the superimposed flask containing the mold, is stripped from the pattern by four posts and after lifting off the mold, the stripping plate is lowered to molding position on the pattern plate. On the bench at the left of Fig. 19 is shown the cope of the mold with a circular depression in the center which fits over the skim gate in the drag. With this equipment, which has been patented by the Allyne-Ryan Foundry Co., two men can produce 165 molds containing 825 pistons per day. In a plant of this kind, the cleaning, room presents many problems, since the inspection is unusually severe to curtail the subsequent rejections by the motor car builders. Practically all of the casting are cleaned on a piecework basis, many of the chippers earning from $65 to $75 for 12 days' pay. In this department, the same as in the foundry, the piecework price on a casting is never changed after it once has been fixed. A view of one section of the cleaning room is shown in Fig. 23. To keep pace with the large output of the foundry, cleaning operations are carried on night and day. The equipment is unusually complete, consisting of a large battery of exhaust tumbling mills, sand blast machines, swinging and stationary grinders, etc. All of the air lines are carried underneath the floor, connections being made through openings in floor plates conveniently distributed throughout the shop. All overhead piping is eliminated by this arrangement and greater flexibility of air service is obtained.

All of the cylinders are subjected to 100 pounds water pressure to detect leaks and the battery of six testing benches is illustrated in Fig. 24. To facilitate this work, special frames have been built which require a minimum amount of adjustment for testing the water jackets. One of these frames is shown in Fig. 25. The casting undergoing the test is a cylinder head, the simplicity of the clamping being apparent. The frame is of the roll-over type which enables the operator to turn over the casting to inspect it for leaks.

To those not familiar with the automobile cylinder business, the extent of the industry will prove a revelation. With the annual automobile output approaching the million mark, orders for 25,000 to 50,000 cylinders are the rule, rather than the exception, and in spite of the large cylinder capacity of these specialty shops, the requirements are inadequate to the demand. Some motor car manufacturers insist upon the shipment of a carload of cylinders every day, while the needs of others are so great and immediate that they are compelled to make deliveries by express.

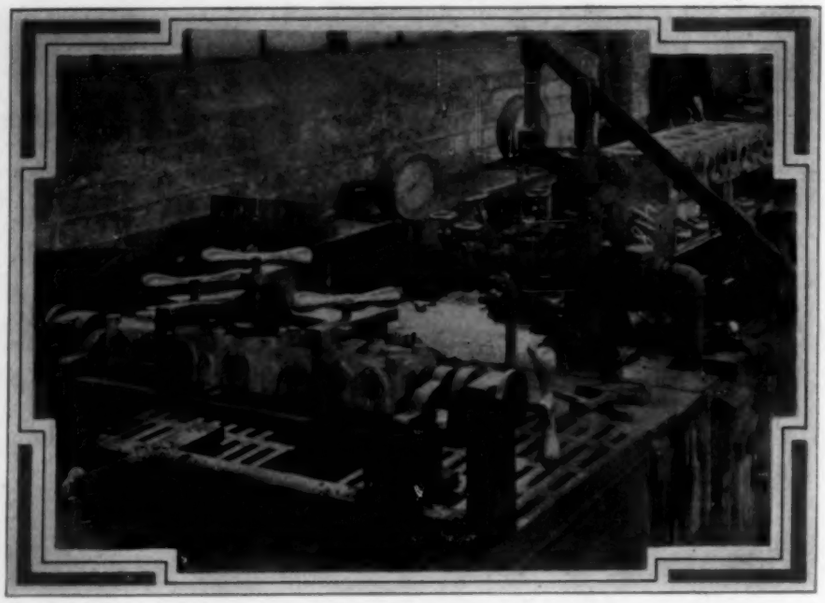


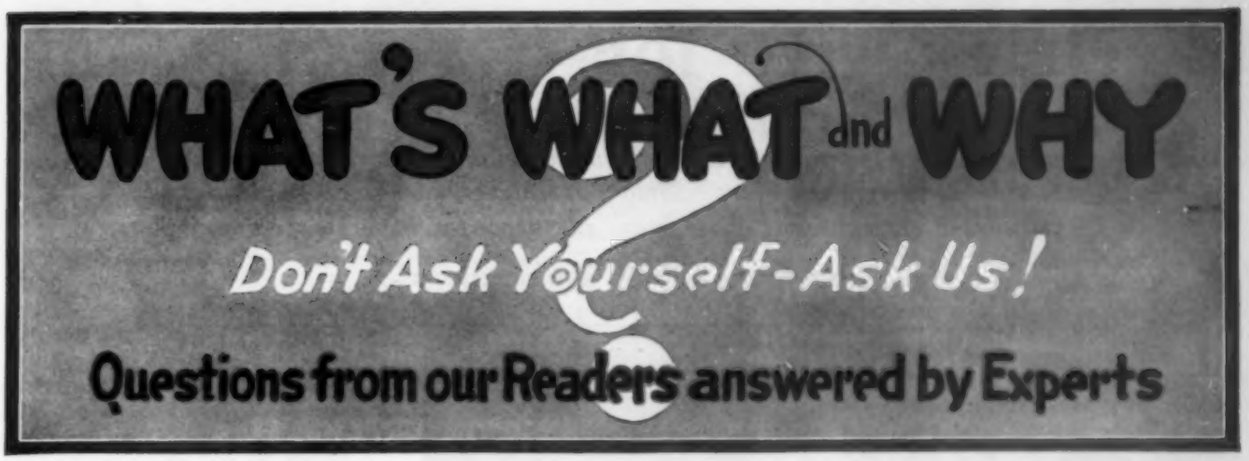
FIG. 25—A SPECIAL FRAME FOR RAPIDLY TESTING CYLINDER HEADS

New Process for Melting Steel Scrap

A new process of melting steel scrap, which is designed to produce metal free from oxide and blow holes with a minimum loss of the metal constituents has been patented by Albert E. Greene, Seattle, assignor to the American Smelting & Engineering Co., St. Louis. Mr. Greene's process differs from most of the previous methods used to secure steel free from the presence of oxides of iron and manganese in that it acts as a preventative against injurious effects during the melting of the steel scrap rather than attempting to offer a means of remedying the undesirable effects after they have been embodied in the metal. The usual remedy for dissolved oxides is to add deoxidizing alloys at the time of tapping the heat so that there will be as little time as possible for the absorption again of more oxides from the slag. The Greene process, it is said, will eliminate excessive loss by oxidation by the use of a slag which prevents oxidation by the action of a reducing agent.

In describing his improved method, Mr. Greene considers a case where ordinary steel scrap, carbon, 0.25 per cent; silicon, 0.35 per cent; and manganese 0.70 per cent is to be melted. For this purpose, a basic lined electric furnace is used in which a small amount of steel is introduced either by melting or else by charging in the molten state. A slag is then melted on top of the metal, for example, a lime-silica slag, the necessary fluidity being obtained by combining with the basic oxide of lime, an acideous oxide such as silica. This fluid slag readily covers the entire bath of molten metal and makes possible quick reducing action on the oxides that collect in the slag. A fluid slag, it is said, also serves to keep solid carbonaceous reducing agents from contact with the steel preventing a recarburization of the the metal. It is necessary, however, to provide the reducing agent in a reasonably fine state so that chunks of it will not dip through the slag and come into contact with the steel. After a suitable slag has been prepared in the furnace, the scrap is charged and fine coke is thrown upon the slag. During the melting of the scrap, fine coke or another form of reducing agent is added as conditions require.

In this process, the silicon and manganese and the iron may be prevented from oxidization. When the bath is reduced to the state where it is free from oxide of iron, the steel is then in a deoxidized condition and is ready to pour as soon as the temperature is properly regulated. The amount of reducing agent necessary to bring the slag to a reduced condition depends upon the oxides which enter with the metal. The color of the slag is an indication of the extent of reduction. Instead of a solid reducing agent, a reducing gas such as producer gas may be readily employed with satisfactory results.



Making Ferro Silicon

How is ferro silicon of the higher percentages produced?

The electric furnace is used in making high silicon pig iron above 12 per cent silicon. It is produced in the following manner: The charge usually consists of borings and turnings, sandstone to supply the silicon, and coke for fuel. The process is similar in many respects to reduction in the blast furnace except that the silicon is reduced by the heat instead of the iron, which is already free from oxygen. The product is cast in shallow forms and as it is extremely brittle it is broken easily with a hammer and reduced to appropriate size for use. It is used in producing steel with high silicon content which adds to brittleness, bringing tensile strength and elastic limit close. It has been in demand recently in making steel for high explosive shells, which should shatter into many pieces when exploded, rather than to yield at only one point.

Terms for Export Sales

At what terms have the recent sales of pig iron for export been made?

Many of the numerous sales of pig iron to foreign countries recently made have been on a f. a. s. basis; that is, free alongside the ship at the shipping port. The seller upon delivery of the iron to the ship is given a ship receipt showing attested weights and upon presentation of this receipt with the invoice to the New York bank where the buyer has established a credit, payment is made. Generally, the shipper does not prepay the rail freight from the furnace to the boat. Many sales also have been made on a furnace basis. The plan usually followed when the iron is shipped, is to attach to the bill of lading, and invoice, a sight draft. The bill of lading is made out in the name of the shipper and is indorsed by the latter in blank. These documents then are presented to the New York bank where the consignee has a credit and are taken up by the latter.

A third method of selling which was followed especially before ocean freights became so very high, was on a c. i. f. foreign port basis; that is, "cargo, insurance, freight". The shipper, in this case, pays the ocean freight and insurance in advance but is reimbursed for this outlay and receives payment for his iron before the metal leaves the country by presenting to the buyer's bank the ship receipt showing the metal has been delivered, the receipted freight bills, etc.

Lencauchez Process

Will you please publish a brief description of the Lencauchez process of operating an open-hearth furnace?

In the Lencauchez process, the charge of pig or pig and scrap is held in a molten condition at a low temperature to cause the manganese sulphide to separate from the charge. When this has been accomplished, the temperature is slightly raised—not to the point where carbon is attacked—and air is blown on the surface to effect the oxidation of the phosphorus and silicon.

Coke Classification

What is the difference between standard foundry and smelter coke?

Standard foundry coke should show an analysis of less than 1 per cent sulphur with an ash of less than 13 per cent. The quality of standard foundry coke improves with a reduction in the percentage of ash until this percentage reaches a point where the structure is weakened. Smelter coke may run higher in sulphur than standard foundry grade, and while this increase in sulphur makes the coke undesirable for melting iron ore in a blast furnace, it may be used for the reduction of most non-ferrous ores.

Manganese in Steel

What percentage of manganese is necessary to produce manganese steel?

The behavior of manganese when added to steel is peculiar, according to the percentage used. Below 1 per cent its only action seems to be the removal of gaseous or combined oxygen as it has a greater affinity for oxygen than has iron. It also has a high affinity for sulphur. In proportions from 1 to 7 per cent manganese increases hardness and brittleness under shock in a degree to make the combination of no use and in quantities of from 7 to 15 per cent, manganese steel is produced, the usual proportion being 11 to 14 per cent. This combination is capable of tempering and becomes tough and ductile while retaining its hardness. A tensile strength of 100,000 pounds to the square inch is attained with an elongation of as high as 30 per cent, nearly uniform throughout the piece.

Pig Iron Analyses

We understand some of the analyses of iron, especially steel-making grades which foreign buyers have been filling in this country, differ considerably from those of standard American practice. Can you advise us concerning this?

Some of the analyses required on pig iron for export are wholly unlike the standard bessemer, basic or low phosphorus grades in this country. France, for instance, has been buying a high silicon bessemer, that is, an iron running over 2.50 per cent as against the 1 to 2 per cent in American standard bessemer. France also requires a basic iron high in phosphorus or around 1.60 which is used in the basic bessemer method of steel-making. The hematite grade which has been inquired for freely on this side by England, France and Italy usually has been an iron 0.04 to 0.05 in phosphorus and approximately 2.50 in silicon and about 0.035 in sulphur.

Electric Drive for Reversing Mills

THE DEVELOPMENT of a reversible motor suitable for the heavy, irregular load of a blooming mill has led to the adoption of new ideas by designers of large direct-current machines—Motors operating under severe conditions have verified the claims which have been advanced for them by their designers

BY WILFRED SYKES AND DAVID HALL

THE electrically driven reversing mill has been developed rapidly in the past few years. A number of installations have been made and a great many new mills are now being equipped. Within the next year there will be 15 reversing mills in operation in the United States. The success attained warrants a review of this subject together with a discussion of some of the characteristics of such equipment.

Since the first installations were made, mill engineers have been in a position to check the operation and economy of such equipment. Practically all the new installations of reversing mills contemplated at present will be electrically driven. Although the electrically driven mill has not at present made the advance in this country that it has in Europe, it is characteristic of American practice to adopt quickly any device which has been demonstrated as suitable to American conditions. The reversing mill as developed in this country and as shown by the existing installations, differs in many respects from European construction. Special attention has been given to the mechanical construction of the reversing motor.

The reversing plate-mill drive installed at the South Chicago plant of the Illinois Steel Co. was the second drive of this type to be put into operation in the world and it was designed without knowledge of the fact that a similar arrangement was being constructed in Europe. It was a number of years later before a reversing blooming mill was electrified.

The first successful installation of a reversing blooming mill was that of the Steel Co. of Canada, Hamilton, Ont. This installation consists of a double reversing motor capable of developing about 10,000 horsepower, maximum, and is supplied with power from a flywheel motor-generator set with two generators. This mill has been operating satisfactorily for over three years. It is at present working at a rate considerably in excess of the capacity specified when it was installed. The following are particulars of the mill and driving equipment:

Size of ingot, inches	15 x 17
Weight, pounds	4,000
Finished material, inches	4 x 4
Elongation	16
Number of passes	19
Capacity, tons per hour	60

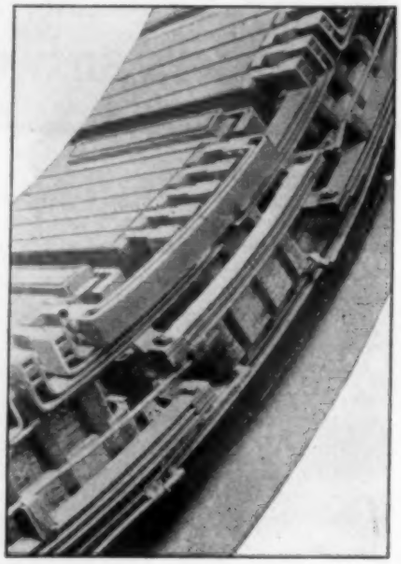


FIG. 1—COMPENSATING AND COMMUTATING POLE WINDINGS ON REVERSING MILL MOTOR

Roll diameter, inches	30
Pinion diameter, inches	34
Speed, full motor field, rev. per min.	70
Speed, weakened motor field, rev. per min.	100
Driven from motor	direct
Number of motors	2
Voltage across each armature	600
Max. operat. torque, foot pounds	900,000
Max. motor horsepower	10,000
Number of generators	2
Rated power of driving motor of set, horsepower	1,800
Weight of flywheel, pounds	100,000
Speed of flywheel set, rev. per min.	500

The largest installation at present in operation is that of the Bethlehem Steel Co. which drives the 35-inch blooming mill at the Lehigh plant. Both of the installations mentioned in the foregoing have double the motors due to the amount of power required. The machines are arranged as shown in Fig. 2. The symbols in Fig. 2 are shown in the following table:

OCB	—oil circuit breaker with no-voltage and overload trip
V	—voltmeter
A	—ammeter
W	—wattmeter
DCG	—direct-current separately excited generators
DCM	—direct-current separately excited roll motors
CB	—circuit breakers — 1 generator field—2 main circuit
R	—relay for operating circuit breaker in generator fields
FC	—field controller
F	—flywheel
SE	—shunt exciter for generator and roll motor field
SeE	—roll motor exciter the field of which is separately excited by the main d-c. circuit
SACM	—alternating current squirrel cage induction motor
ACM	—alternating-current wound rotor induction motor
SR	—automatic liquid slip regulator

A somewhat similar drive is installed at the plant of the Central Steel Co., Massillon, O., but a single motor is used for driving the mill, the capacity of the motor being approximately 8,000 horsepower. Characteristics of these mills are as follows:

	Bethlehem Steel Co.	Central Steel Co.
Size of ingot, inches	19 x 23	18 x 20
Weight, pounds	10,000	5,000
Finished material, inches	4 x 4 up	4 x 4 up
Elongation	10-12 av.	Up to 20
Number of passes	17–21	19–21
Capacity, tons per hour	100	60
Roll diameter, inches	30	30
Pinion diameter, inches	35	34
Speed, full motor field	40	50
Speed, weakened motor field	120	120
Driven from motor	direct	direct
Number of motors	2	1
Voltage across each armature	600	700
Max. oper. torque, ft. lbs.	1,550,000	750,000
Max. motor horsepower	12,000	8,000
No. of generators	2	1
Rated power of driving motor of set, kilowatts	2,000	1,500
Wgt. of flywheel, pounds	100,000	60,000
Speed of flywheel set, rev. per min.	375	375

In the recent installations, the reversing motor is arranged to have the characteristics of a compound machine. This is obtained indirectly through a series exciter. The current to be handled in the main circuit may be as high as 10,000 amperes, so it is obvious that it would be extremely difficult to reverse the series field each time the motor is reversed, which would be necessary to keep both fields in the same direction. A series exciter is therefore used, the voltage of which is proportional to the current flowing in the main circuit. The armature circuit of the series machine supplies a separate winding of the field of the motor which may be readily reversed when the direction of rotation is changed. The switches for reversing this field are operated from the same point on the master switch that reverses the field of the generator. The use of a motor with compound characteristics lessens the strain of the mill on the mechanical equipment as the drive has more or less "give" to it. At the same time, if there is an extreme load due to excessive draft or cold steel, the motor characteristics tend to compensate by automatically increasing the available torque and decreasing the speed.

The design of the reversing motors and the generators supplying them with power presents many problems not ordinarily encountered with direct-current

machines. As the success of this type of mill depends upon the machines meeting the severe operating conditions without injury or deterioration, a brief review of the principal characteristics may be of interest.

There is no other class of service which might be properly compared with that of a large reversing mill. The heavy torques, the sudden peak loads and the quick reversals all call for apparatus of substantial mechanical design, and flexibility in electrical characteristics. The exchange of energy between the driving motor and the generator undergoes changes at a very rapid rate. In fact the driving motor must perform the functions of a generator as well as that of a motor, and the supply generator may at one instant be furnishing current to the driving motor, and at the next instant it may be receiving electrical energy from the driving motor, and delivering mechanical energy to the flywheel. For example, the equipment at Bethlehem, which consists of two 600-volt motor armatures supplied by two 600-volt generator armatures all connected in series, may at one instant show a swing of 10,000 amperes, and at the next instant the swing may be of an equal value in the opposite direction. There must be rapid adjustments of flux conditions in both motors and generators in order to meet these reversals without showing harmful sparking at the brushes, and as the swings which occur many times a minute represent overloads of 200 to 300 per cent, the design of the direct current machines must be suited to these overloads, both in current carrying capacity and in flux conditions. Especially must the machines be designed for good commutation. This cannot be obtained at such overloads without making liberal allowances for the commutating flux, as the ratio which the commutating flux bears to the load must not be disturbed by leakage conditions, even at the overloads. This feature is more readily obtained by compensating the armature reactance to which further reference will be made and this type of construction is of greatest importance, to successful results.

The choice of voltage per commutator and the use of two armatures, the commutators of which are connected in series for large powers, is deserving of careful analysis, and this voltage should be selected with due consideration of the motor, the generator and the auxiliary apparatus. The following arguments are to show that, other things equal, it is desirable to adopt a relatively high voltage; viz. 600 volts and by series connection, alternating a motor with generator, derive all the benefits of 1,200 volts.

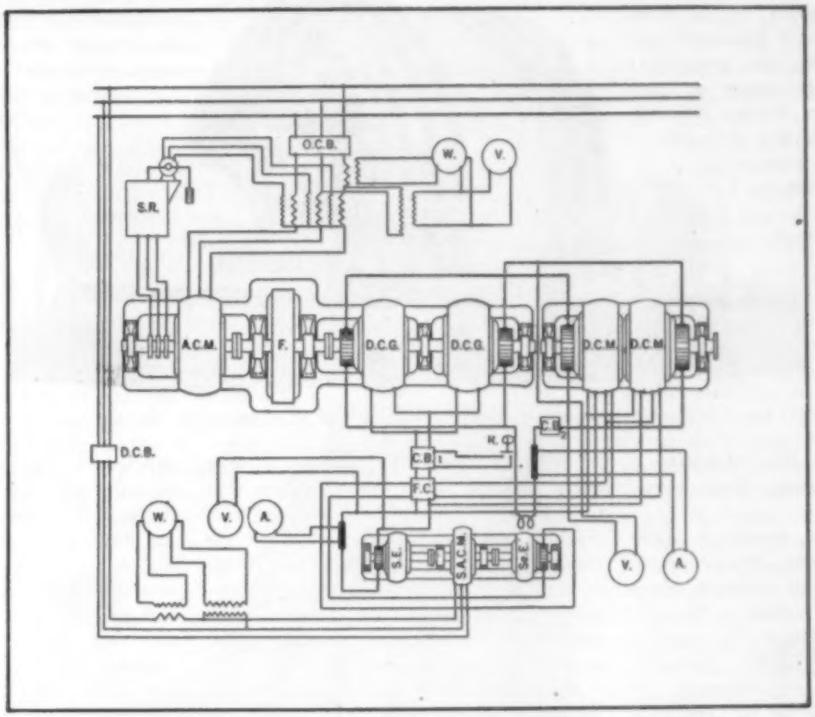


FIG. 2—SCHEMATIC DIAGRAM OF CONNECTIONS OF LARGE REVERSING MILL DRIVE

The electrical equipment of a reversing rolling mill includes both the direct-current generator as well as the direct-current motor, and the generator does not furnish power to any other apparatus except the roll mill motor. The voltage should be of such a value as will give the best balanced equipment and the choice of voltage becomes a very important factor as the design of the entire equipment may be said to depend in a great measure upon the voltage selected.

The use of 250 volts has been common practice in rolling mills and it is natural that this voltage should be considered. However, for large capacities, there are many objections to so low a voltage among which may be mentioned heavy currents, large commutators, larger machines, lower efficiencies, increased cost of auxiliary apparatus, higher maintenance charges and increased mechanical difficulties.

The magnitude of the current becomes a factor when the power required on peak loads may reach 15,000 to 20,000 horsepower and not only are the connections, cables and switching apparatus expensive, but the losses in these parts are roughly proportional to the currents. The approximate cost of these parts will vary inversely as the voltage.

The size of commutators and the number of brushes will be a direct function of the current and it is desirable to keep down the size of the commutators from at least three points of view—mechanical difficulties of construction, overall length and cost. No part of a direct-current machine is so difficult to construct as is the commutator, and for this reason the construction of commutators has received, and will continue to receive the most careful consideration from both the design and the manufacturing points of view. So important is the commutator and commutation that when these are right, there is seldom any cause for complaint. Increased voltage not only reduces commutator length, but insures less overall length—an extremely desirable factor.

The efficiency of the equipment as a whole will be higher with increase of voltage within certain limits, for in such installations the peak loads are relatively high as compared with the average or mean load.

The commutating conditions of the generator is one of the items which must be carefully considered in the selection of voltage, especially as economies can be effected by operating the flywheel set at a reasonably high speed. It is desired to consider whether a generator can be designed better for one voltage than for another, and what is a safe operating speed for a generator of a given output and voltage. With a

view of setting forth the relations of kilowatt capacity and speeds, the writer has chosen familiar voltages of 125, 250, 600, 1,200 and 2,500 volts. There are certain well established relations and limits in direct-current machines, which lead to limits of output. However, it is not so much these limits, but the relation of possible outputs of different voltages. At 600 volts the possible outputs are greater than at either 250 volts or 1,200 volts. This means that with the same degree of safety it is possible to make a larger 600-volt generator than a 250-volt or 1,200-volt generator, for a given speed. This relation applies at all speeds. The product of kilowatt output and revolutions per minute is approximately a constant for a given voltage. This relation is frequently lost sight of in considering the possibilites of machines for large output at high speed. From this we deduce that 600 volts per commutator is a desirable selection for the generators. A voltage of 600 per commutator has proved well suited for the motor; a lower voltage would lead to relatively large armature diameter. A higher voltage would require few poles with correspondingly heavy rotors, and either of the conditions is undesirable as low inertia effect is important.

To obtain the best operation under heavy peak loads, which are subject to very rapid changes, for example, three times normal load, reversing at the rate of 30 times a minute, it is not only desirable, but it is necessary to neutralize to the fullest extent the distorting effects of the currents in the armature winding. The method of obtaining this result is to slot the pole face, and secure in these slots a bar winding which is connected in series with the armature, making the number of conductors in the pole face just sufficient to neutralize the armature conductors covered by the pole face. The excess winding necessary to produce a commutating flux is concentrated on the commutating poles, located midway between the main poles. By locating in the pole face, the ampere conductors which neutralize the armature reaction under the pole face, the distortion of the flux at the main pole face is prevented. This has a beneficial effect in two ways. First, it prevents, under sudden changes of load, a sweeping across the pole face of the main flux under the pole, and it prevents a distortion of the main flux which is a very important consideration, as this lowers the maximum voltage between adjacent commutator bars, which would otherwise obtain. As it is the maximum voltage between commutator bars, rather than the average voltage, which determines the design, the importance of this type of construction becomes evident for this class of service. Another very important consideration in this arrangement of the compensating winding is that the leakage from the commutating pole is very much less than would be the case if all of the windings were concentrated on the interpole. This fact permits carrying heavier overloads, and it is the overload capacity which determines to a great extent the suitability of machines for this class of service.

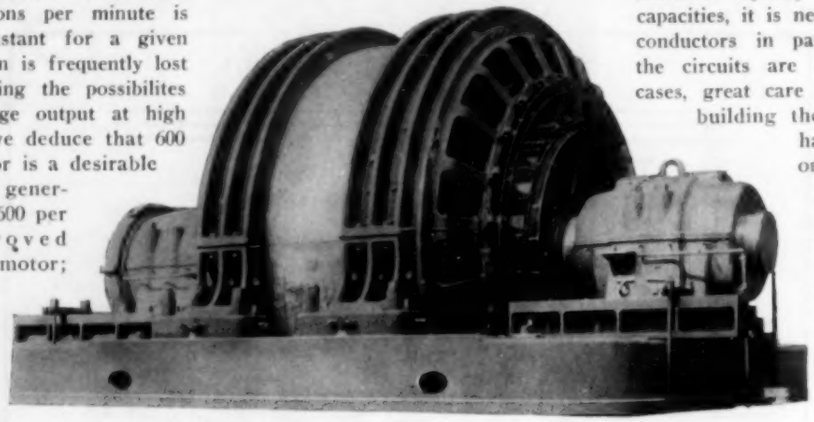


FIG. 3—LATEST TYPE OF DIRECT CURRENT BLOOMING MILL MOTOR

It is evident that the leakage is very much reduced, when one considers that the leakage is mainly between the main pole tip and the interpole, and that the magnetomotive force producing this leakage is made very much less by locating a large proportion of the ampere conductors in the main pole face. This type of winding is shown in Fig. 1.

This construction permits the operations of the machines through a wide range of voltage; in other words, the stability of the main flux is insured without regard to the strength of the main field winding. This is an important factor in the general scheme of control, as the speed of the motor and the direction of rotation of the motor depend upon the generator voltage and upon the field strength of the motor. These two factors must be susceptible to rapid changes and wide variations in order to effect the desired result.

In referring to the relative merits of commutating pole machines versus machines with compensating winding, for this class of service, attention may be called to the fact that compensating windings are difficult of construction, in machines having very large current, as there is a limit to the desirable physical dimensions of a single pole face conductor. With heavy current machines, a suitable arrangement of compensating conductors is often quite a problem in a specific design. The most desirable arrangement is to have all compensating conductors connected in series, but the possibility of such an arrangement is limited by the capacity and voltage of the machine, and here again there is a decided advantage in not having the voltage too low, for large power capacities. For example, a single conductor having a cross section of more than two square inches, is seldom used in the pole face winding. Assuming a current density of 1,500 amperes, a single conductor, with all conductors in series can be used on a 3,000 ampere machine, which, at 600 volts, represents an 1,800-kilowatt capacity. For larger current capacities, it is necessary to connect the conductors in parallel, and frequently the circuits are in parallel. In such cases, great care must be exercised in building the machines so as to have good joints, in order to insure the proper division of the current. Generally speaking, the compensating winding of large capacity machines consists of a relatively small number of conductors, and simpler, better mechanical arrangements can be affected than are possible with smaller capacity machines. It is also desirable to design the compensating winding and the commutating pole winding so that no shunts will be necessary. This can readily be accomplished as it is possible to calculate very closely the required ampere conductors for compensating the armature reaction and furnishing the necessary excitation for the commutating pole. By avoiding shunts, one is insured of the simultaneous change of current in the compensating winding and the armature winding.

The type of field winding used on roll mill machines should be very simple, and not easily damaged. If a low voltage is used for excitation of the direct-current generator and direct-current motor field coils, these coils can be made of copper strap winding with a layer of asbestos between turns, and the bare edges exposed to the air. Such coils are almost indestructible by heat. Strap wound field coils arranged in two or more concentric sections insure a natural and easy ventilation.

As this type of machinery is exposed to mill dust, and as this dust is likely to contain a large percentage of conducting material it is advisable in the design to embody more liberal creepage distances than are necessary for ordinary service.

How Aluminum Sheets Are Rolled

ALUMINUM has been used by mankind for a period but slightly exceeding two decades, yet during this time science has developed means of refinement and manufacture which have infinitely broadened the field of application of this useful metal—This article describes the process of rolling aluminum sheets

THE tremendous increase in the consumption of aluminum during the past decade can only be thoroughly appreciated when it is remembered that this metal has been in common use but little more than 20 years. Previous to the perfection of the electrolytic method of refinement, the annual production of aluminum was less than 70 tons. At the present time the annual tonnage produced must be written in five figures. The electrolytic process of refining not only served to increase the utility of aluminum to mankind, but was also the means of reducing the cost of production to approximately one-tenth of the original figure. The unique characteristics of the metal and the reduced cost of production soon led to its adoption for a variety of uses where a strong, light-weight metal, capable of taking a nice polish, is desired.

The first aluminum products were cast by methods similar to those used in handling brass, but unlike brass, aluminum could not be annealed and made ductile, so the metal was limited in its scope to articles which could be produced in the foundry. Although recent years have brought forth few pronounced improvements in methods of refining aluminum, the past two years have seen the development of a method of rolling the metal which permits of its being stamped and spun as easily as brass, copper or sheet iron. One of the first companies to appreciate the possibilities offered by aluminum in the form of ductile sheets was the Cleveland Metal Products Co., Cleveland. This company has installed a complete rolling mill for the purpose of manufacturing aluminum sheets. A general view of the building, which is of mill type construction and is 180 feet 2 inches long and 79 feet 8½ inches wide, is shown in Fig. 3. The building contains the store room for the raw material, the melting and reheating furnaces and the rolling mills. In addition to this equipment, 5 and 15-ton traveling cranes and a number of shears and similar machines have been provided. The crane span is 77 feet.

The pigs of raw metal from which the sheets are rolled are supplied mostly by the Aluminum Co. of America, and are of the so-called four-piece type weighing about 30 pounds. The metal is reduced to a refined state before it is shipped to the Cleveland Metal Products Co., where it is remelted for the purpose of casting into convenient shapes and stored ready for use in the mill. A surplus always affords protection against interruption in delivery.

The first step in the preparation of the pig metal for the mill consists in remelting it at a temperature of about 1,350 degrees Fahr. in two gas-fired furnaces, which are lined with salina firebrick and have a capacity of approximately 5,000 pounds each. The molten metal is tapped from the furnace into a small cask-shaped ladle, in which it is carried to the ingot mold and poured, as shown in an accompanying illustration. The ingots are 4 x 12 inches in cross-section and are 17 inches or more in length, depending upon the size of the finished sheet desired. The mold and ingot are carried by a hand-operated crane to the opposite side of the building, where the ingot is released from the mold and placed on a pile in front of the reheating furnace. The ingots are heated in this furnace to a temperature of approximately 900 degrees Fahr., preparatory to rolling. This furnace is equipped with indicating and recording pyrometers and is also gas-fired. An electrically operated charging machine is used to place the ingots in the furnace. The first stage of the rolling process is accomplished on the breaking-down mill to which the ingots are carried on a small hand truck. From seven to 10 passes are re-

FIG. 1—POURING THE REMELTED PIG METAL INTO AN INGOT FORM

quired to reduce the ingot from 4 inches to from ¼ to ¾ inch in thickness. The entire rolling process requires from 10 days to two weeks. Fig. 2 shows an ingot about to be placed in the breaking-down mill. The rolls of this mill are 28 inches in diameter and 84 inches long.

After the break-down stage, the sheets are cut on the slab shear and then rolled through the slab mill to roughing gage. The slabs or sheets are annealed at various stages of the process, the amount depending upon the degree of hardness desired in the finished product. The temperature of these ovens is approximately 700 degrees Fahr. The sheets, after passing through the slab mill are of nearly the required thickness but are still fairly rough on the surfaces and must be run through the finishing rolls before they are smooth and of the requisite thickness. Two of the finishing mills are 84 inches long and can handle sheets up to 72 inches wide and one is 60 inches long and can take sheets up to 50 inches in width.

The three finishing mills, the slab mill and the breaking-down mill are all operated at 35 revolutions per minute by one 600-horsepower, 2,300-volt, phase-wound induction motor which is geared to a common shaft carrying a heavy flywheel. A strip mill, which is used to reduce narrow heavy stock to gage, is driven by an individual 250-horsepower motor which operates the mill at 28 revolutions per minute. The rolls of this mill are 20 inches in diameter and 36 inches long. After the rolling process has been completed, the sheets are flattened on a straightener or buckler and are then passed through the gang shear which

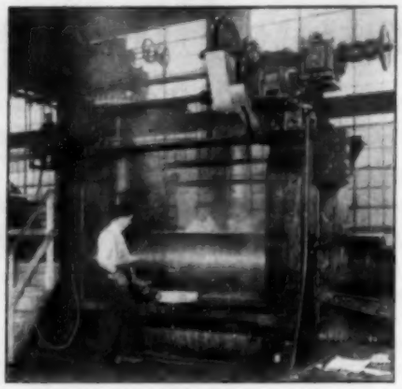


FIG. 2—PLACING THE INGOT INTO THE BREAKING-DOWN MILL.

cuts and coils the sheets in preparation for further manufacture.

Book Review

Steel and Its Heat Treatment, by Denison K. Bullens; 431 pages; cloth; illustrated; published by John Wiley & Sons, Inc., and furnished by *The Iron Trade Review* for $3.75, net.

For having satisfactorily covered the comprehensive field of heat treatment without resorting to the usual employment of intricate formulas and questionable theory, the author of *Steel and Its Heat Treatment* should receive the unqualified praise of the many readers of technical books who appreciate the simple exposition of a complex subject. Mr. Bullens has incorporated in the volume, a thorough treatise on heat, steel, and the effect of heat upon steel, three factors "linked together by the human element" according to the author's preface.

The subject is introduced in a chapter devoted to the testing of steel. The various tests for static and dynamic strength are carefully described. The Brinell test for hardness is clearly explained. The structure of steel is the subject of a chapter devoted to a detailed account of the characteristics of the different combinations of elements in the various steels. Photomicrographs of ferrite, pearlite and cementite are used for illustrating the physical characteristics of steels. The processes of annealing, hardening, tempering, toughening, and case hardening are described and discussed in separate chapters. The author does not stop at explaining these heat treating operations; he describes practical methods, and shows what is being done in modern plants where steel is undergoing such treatment every day.

"Heat Generation" is the title of a chapter of utmost value to manufacturers of heat-treated steel. Various fuels of furnaces are discussed and their comparative values in relation to costs are mentioned in an exhaustive treatment of fuel economy. Furnace design and construction is not overlooked and electric furnaces receive some attention. The following chapter on "Heat Application" deals more thoroughly and in much detail with the various types of furnaces.

The modern practice in heat treatment as applied to the well known alloys of steel is clearly set forth in the latter part of the book. Carbon, nickel, chrome, chrome-nickel, vanadium, manganese, silicon, and other steels are dealt with in a comprehensive manner, the practical side of the subject being emphasized rather than the theoretical. In the next few chapters, the author introduces some information on tool steel, tools and miscellaneous heat treatments which is of unusual value to the user of such material.

FIG. 3—GENERAL VIEW OF ROLLING MILL SHOWING SHEETS AT VARIOUS STAGES OF THE ROLLING

Rapid Methods

Are a Feature of the Development on the Mesabi Range

Despite the fact that during the present season much of the energy of the Mesabi range is being applied to the removal of ore, considerable development work is in progress. The western Mesabi especially has been characterized by this activity. Several new properties have been opened. These have all been open pits. About four miles west of Hibbing is the Lamberton, stripped and mined by Butler Bros. Operations at this property started last winter at about Christmas time and the mine was producing the first of July. At Nashwauk, the Mace No. 2 mine was developed by the Longyear-Bennett interests. This was an open pit stripped by Butler Bros., with a 370-ton Bucyrus shovel, the largest of its kind made. It is a small property to which shipment of 200,000 tons was assigned for the present season by its owners. West of Nashwauk, the Harrison mine has been seeing much development work. This is also being developed and mined by Butler Bros., who are selling much of their ore to the Jones & Laughlin Steel Co. interests. The big shovel which was in use at the Mace is now operating at this mine, casting much of its overburden onto the banks. It is developing into a large property and possesses many interesting features from the standpoint of the miner. A mile west, the Kevin is being developed. This is a state lease also stripped and mined by the Butler company. Stripping operations were started last winter and the mine shipped its first cargo in August.

The features of these several properties is the great speed which has been used in their development. With the exception of the Harrison, shipping commenced about six months after the first development operations began. It is a tribute both to the energy of the contractors and to the modern methods of stripping.

The Oliver Iron Mining Co. is stripping the Arcturus mine at Marble. This is a property of historic interest upon which certain of the first experiments as regards the concentration of iron ore were carried on. The mine will not ship this year and much of the present activity has been confined to getting the property ready for next winter's stripping operations.

There is also development work at several other of the western Mesabi properties. Stripping has been in progress at the Hawkins mine of the International Harvester interests at Nashwauk, at the Holman of the Oliver Iron Mining Co. at Taconite and at the Canisteo at Coleraine. These operations have been used to materially extend the pit limits and to uncover additional ore for this and next season's shipments.

The Kennedy Mine

The Kennedy mine was the first Cuyuna mine, and so far the only one, to reach the one-million figure in total amount of ore shipment. It is the pioneer mine of the district, and as usually happens in the case of such properties a large amount of good ore was unexpectedly encountered during mining where none was previously indicated. So the life of the mine has been materially lengthened. The 1916 shipment is expected to total 250,000 tons, of which amount 110,000 tons is in stockpile, not yet shipped. The ore is of non-bessemer grade, and of low moisture content, and is now being taken from three separate lenses, while formerly it came from four. The main level is 120 feet below the top of the ore. The operator is the Rogers, Brown Ore Co.

KENNEDY MINE ON THE CUYUNA LOOKING NORTHWEST
Shows Coal-dock Trestle, Enginehouse, Shaft House, Beginning of Long Stockpile Trestle, Loaded Northern Pacific Ore Cars, Waste Rock Piles to Right

The Adamant Iron & Steel Co., recently invited the public to witness the process of making a new tool steel which is claimed to be a substitute for high speed steel. The furnaces, which are located in the plant of the Cleveland Steel Valve Co., Kent, O., produce an alloy steel containing neither vanadium, molybdenum, cobalt nor tungsten, although according to the manufacturers, the materials used are freely obtainable. A public demonstration of the steel was given at Sheffield, Eng., May 18.

Russian Cars

Being Made in Canada — The Nickel Issue in an Election

Toronto, Aug. 29.—During July 95 per cent of the steel output of the Nova Scotia Steel & Coal Co. went into war munitions. The company manufactures shells up to 12-inch, producing all the raw material from its own properties. Its order for 2,000 cars recently filled for the Russian government was also completely fabricated from its own plants, being manufactured and delivered in Russia without being dependent on any other concern, which is certainly a unique incident in the history of the Canadian steel trade.

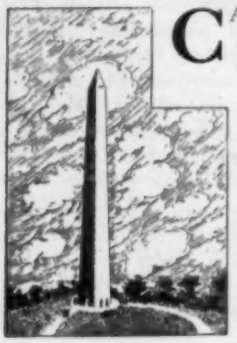
It is officially announced that negotiations between representatives of the Canadian Car & Foundry Co. of Montreal and the Anglo-Russian commission in New York, have resulted in the company obtaining an extension of time for the carrying out of its big Russian contracts. The interest on the money that the Car company advanced has been settled.

The recent election in South East Toronto, in which the nickel issue was kept in the foreground by the Liberal party, which assailed the government's policy of permitting the exportation of nickel ore for refining in the United States, was held Aug. 21, and resulted in a crushing defeat for the government. The majority of 3,763 by which the Conservatives carried the seat at the previous election was converted into a Liberal majority of 663. This is accepted as an indication of how strongly public sentiment is worked up on the question, owing to the DEUTSCHLAND incident and the prospect of further supplies of nickel reaching Germany by the submarine route, which has proved successful.

Business News of Nation's Capital

Anti-Dumping and Tariff Commission Features of Revenue Bill Vigorously Attacked—Webb Bill to Permit Combinations to Carry on Export Business Has Chance to Pass

Bureau of *The Iron Trade Review*,
206 Corcoran Bldg.,
Washington, D. C., Aug. 29.



CAMPAIGN speeches are constituting the greater part of the discussion in the senate which has the revenue bill before it as the unfinished business. Relatively speaking, there has been but little specific analysis of the measure itself. Among those who have made direct attack on the munitions tax section of the revenue bill were Senator Penrose of Pennsylvania; Senator Sherman of Illinois, and Senator Weeks of Massachusetts. One of the principal objections made to the provisions of this section is that it falls upon products which to a large extent are produced in the north and exempts in part or entirely other sections of the country, particularly the south.

The action of the senate committee on finance amended the house bill so that the taxes are based upon net profits, instead of upon gross receipts. This has been accepted generally as a marked improvement. At the same time, it is contended that the proposed taxation still savors of injustice. Senator Sherman pointed out the instance where a contract has been made. It is known, he said, what the income tax is and what the wages are and that a reasonable estimate can be made upon what the raw materials will cost, and that collateral items can be figured out. But it was insisted that there is no way to make an estimate of the unanticipated burdens that may be laid upon the producer by the act as it is framed. He maintained that it is fair to exempt from tax on net profits of munition manufacturers contracts that are existing at the time the law becomes operative He has prepared an amendment of that kind which he proposes to offer.

The Anti-Dumping Clause

Senator Penrose said that the anti-dumping clause in the pending bill is entirely ineffective and will accomplish no purpose whatever. He declared that the provision "that such act or acts be done with the intent of destroying or injuring an industry in the United States," etc., is in itself sufficient to destroy the effectiveness of the bill. He asserted it is absurd to prove that some chemical trust in Germany, for instance, is dumping its cheap products on the American market and exterminating the American manufacturer. By the time that such an intent was established, it was asserted, more than likely the American manufacturer's establishment would be closed. It was declared that a more effective dumping law is that in force in Canada, which does not open the door to any discretion or for any complication of circumstances, but recites the bald fact of underselling.

The so-called non-partisan tariff commission section of the bill has also been attacked, not only on the floor of congress, but by business interests throughout the country. It is asserted that the bill as reported to the house by the committee on ways and means was emasculated by the house when it passed that body and is continued in its present form before the senate. Objection is made to the fact that the senate committee on finance has sustained the house action in eliminating the provision for a permanent or a continuing appropriation and left it where it can be partly or entirely killed by an unfriendly appropriation's committee at any time. There has also been vigorous protest against the proposed reduction of the salaries of the members of the commission from $10,000 to $7,500. This was done in the house in the face of the fact that by a vote of 195 to 10 six weeks previously it created a rural credits commission, a body that will have less work and fewer responsibilities, providing a salary of $10,000 a year for each member of that body. It has also been pointed out that members of the federal trade commission and the interstate commerce commission received an annual salary of $10,000, while members of the federal reserve board are paid $12,000 yearly. The principal reason for reducing the salaries of the proposed tariff commission members originated with congressmen, who, taking themselves too seriously, contended that they receive $7,500 only a year and that members of the tariff commission are not entitled to any more than that. There has been considerable talk that congress proposed to make a general reduction in the salaries of the various government commission and board members, but it is not thought likely such action will be taken. Business interests in letters and telegrams have protested to members of congress that unless the tariff commission is made one of the first rank and pay equal to any other, the highest talent cannot be had and that it will utterly fail to meet the situation or satisfy the country.

President Wilson is said to have taken personal interest in the situation and to be prepared to urge the senate to restore the original provision of the tariff commission section as it was reported to the house. There was actually adopted at a Democratic caucus of the senate an amendment providing that the tariff commission should not engage quarters for a longer period than two years. The intent of this provision was plainly to make the commission appear to be a temporary body, thus depriving it of one of its most effective features and tending to discourage men of high standing from accepting office as commissioners. This amendment, however, did not appear in the section when the revenue bill was reported to the senate.

Export Combinations

Washington, Aug. 29. — Failure met efforts of supporters of the Webb bill, legalizing export combinations, to have it passed in the house last Friday. When Chairman Webb, of the committee on judiciary, attempted to call the measure up by unanimous consent agreement, Representative Buchanan, radical Democrat, of Illinois, served notice that he would object to consideration of the bill. As there was not a quorum of the house present this made it necessary for Mr. Webb to withdraw the bill. It is proposed by him, however, to make a motion that it be taken up today. Inasmuch as leaders of both parties have called for the return to Washington of absent representatives in order to have a quorum present today, it is thought Mr. Webb will be able to get the bill before the house. There does not seem to be any substantial objection to the bill and its passage in the house therefore seems probable without any considerable debate being made on it.

The strongest kind of pressure is being brought to bear by individual business interests, the chamber of commerce of the United States, the National Foreign Trade Council and other organizations, to have the bill offered as an amendment to the omnibus revenue bill, now before the senate, so its passage in

the house will be followed at once by like action in the senate. Senator Simmons, chairman of the committee on finance, which has charge of the revenue measure, has said that he had no personal objection to having the Webb measure added to the revenue bill as an amendment. There is consequently a chance that the bill will be enacted into law before adjournment of the present congress.

Those supporting the Webb bill urge that it is vitally necessary as an important part of the preparedness program. It has been pointed out that the natural tendency of American producers to co-operate as do manufacturers in Europe has been balked by the doubt which envelopes the application of the Sherman law to combinations in export trade. Decisions can be found on both sides, a perplexing conflict of counsel prevailing. The net result is that the American business man refuses to take chances with the Sherman law and hesitates to resort to the wholesome co-operative effort, characteristic of his competitors. It has also been made plain that the Webb bill does not amend the Sherman law. It merely declares that no bona fide co-operative organization solely for export trade shall be considered illegal. No such organization will be permitted to operate in domestic trade. The contention is made that instead of restraining it will promote competition in foreign trade by giving American exporters a chance more nearly equal. The smaller manufacturers and merchants, who need export trade to offset recurring periods of depression in their domestic business, if the Webb bill is enacted, will be able to find markets abroad by co-operating with others and increasing the economy and efficiency of their operation. Chairman Edward N. Hurley, of the federal trade commission, has pointed out explicitly the tremendous benefit that would result to iron and steel manufacturers of this country through enactment of the Webb measure. It has been declared to be extremely necessary in order to compete with the German cartel and other foreign trade organizations.

Relatively few companies are able to undertake the heavy expense of direct foreign selling involving the maintenance of selling staffs, warehouse, etc., abroad. There are times when their goods need technical representation which the export business house or merchant is not able to provide.

The statement has been made that the continuation of the present condition means European industrial and governmental co-operation against American compelled co-operation.

Mr. Hurley has declared: "You might just as well man your battleships with 2-inch guns as to expect the average American manufacturing or merchant successfully to meet competition of the cartels and trade associations which European governments not only permit but encourage to combine."

Not only does the Webb bill have the indorsement of the federal trade commission, and the secretary of commerce, but it also has been given personal recommendation by President Wilson. It is earnestly hoped that the latter will exert his influence to have it added to the revenue bill in the senate. Development of European co-operative measures to regain trade has further aroused supporters of the bill to the necessity of passing it at once. It has been pointed out that all producers of the United States will be called upon not only to meet combinations of European producers, but combinations of European governments. To allow the Webb bill to be cast aside, it is declared, would be to ignore the commercial or industrial side of the preparedness program.

Representative Buchanan, who said he would object to consideration of the bill, is well known as a baiter of buisness, and is a strong advocate of organized labor. It is thought also that the so-called Anti-Trust League is exerting its influence to defeat passage of the Webb bill.

Site for Armor Plate Plant

Washington, Aug. 29.—Proposals from various cities as probable sites for the government owned armor plate plant, provided for in the naval bill, will be considered at a hearing arranged by Secretary of the Navy Daniels for Sept. 13. It is expected that many cities will make representations to the general board and Rear Admiral Strauss, chief of ordnance, in an effort to secure the proposed plant. Secretary Daniels has also made it known that he is prepared to consider offers by private armor makers for the sale of their plants to the government. It is not believed that any such offers will be made. A written brief for consideration of the general board, which must approve the site selected by the secretary, must be filed in each case.

The armor plate plant provision in the naval bill calls for the selection of a site that will be suitable from a military and safety point of view. Despite a strong opinion to the contrary, Secretary Daniels says that the government will either build its own plant or purchase one or more of the existing plants. The naval bill calls for a plant with an annual capacity of 20,000 tons and appropriates $11,000,000 for it.

The National Acme Mfg. Co., Cleveland, recently purchased 15 acres at East 131st street and the Belt line at a cost of $100,000.

Saxon Plant

Will be Built in Detroit at Cost of $1,000,000—Michigan News Notes

Detroit, Aug. 29.—The Saxon Motor Co., of Detroit, has had plans prepared for the construction of a new plant to cost $1,000,000.

The Dort Motor Car Co., of Flint, has purchased additional land and will erect a new factory building to cost $50,000. The Durant-Dort carriage plant was adapted for the manufacture of automobiles in April, 1915. The company, at that time, started to put out two machines daily; today the production is 60 cars daily and it is proposed to increase this output to 100.

The Castree Machine shop in Owosso, Mich., has been sold to E. W. Brown, J. W. Radford and Joseph C. Fetter, who conducted the Standard Machinery Co., of Bay City. The new owners will manufacture conveying and sawmill machinery. The shop was established 20 years ago by Arthur Staggell and was sold six years ago to Castree.

The Manistee Investment Co., Ltd., has been organized at Manistee, Mich., with a capital of $25,000. The object of the company will be to promote the industrial development of the city as well as to assist in the establishment of other industries. Officers of the temporary organization are: Chairman, William Lloyd; secretary, John Austin; treasurer, Frank W. White.

The Standard Steel Process Co. has been organized to take over, from Nicholas Gibney and G. G. Stryker, trustees for the bond holders, the Rowland Firth & Sons Co. foundry, Phillipsburg, N. J., which has been idle for about two years. Oscar L. Mills, Pittsburgh, is president of the Standard Steel Process Co., and Jas. L. Monohan, Phillipsburg, is treasurer. The company is chartered under the laws of New Jersey and will have its main office at Camden, N. J. Gray iron and process steel castings will be made. A large addition will be built and other improvements made.

The International Machine Tool Co., Indianapolis, Ind., has recently issued a catalog of its Libby Heavy Duty Turret Lathe as used in railroad shops. The catalog is well illustrated and embodies a number of tables showing records which have been made with this tool. Several illustrations of the kind of work turned out by this machine are given, together with the time consumed in the operation. A list of parts which may be machined on this tool is included.

News of Employers and Employes

Machinists' Strike at Dayton Does Not Develop Great Strength—
The Labor Situation in Other Cities

MAKING many demands, machinists of Dayton, O., estimated from 700 to 2,000, are striking at the time of the most prosperous period of the city's manufacturing history. The National Cash Register Co. was not struck, or the union did not feel strong enough to include it. The men have been out a week, but both employers and employes show no signs of desiring compromise.

International Organizer Griffith of the machinists says the men will stand pat. The manufacturers, according to their representative, A. C. Marshall, have made no effort even to confer with the strike leaders. The morning the strike was called, many factories posted notices saying the demands of strikers were impossible at this time. Sixty companies signed the following statement which appeared as an advertisement in the public press, to wit:

> "The undersigned Dayton employers of machinists and toolmakers, after due consideration, have unanimously decided that they will not reduce the working hours in their respective shops, *nor grant any of the demands made by the Machinists' union.* This movement, with rare exceptions, has failed elsewhere and it will fail in Dayton. The present abnormal condition in the metal trades is the result of the European war and is, therefore, temporary. No workman, merchant or professional man, nor the public in general, can afford to permit the introduction of a policy that will stop or retard the wheels of Dayton's progress and prosperity. . . ."

Twenty-five companies are affected. Mr. Marshall says the men are coming back to work, despite the strike.

The men demand, besides an eight-hour day, time and a half overtime, double time Sundays and holidays, Saturday afternoon to be treated as a holiday and paid as such, double time for overtime after midnight, 5 per cent increase for all men getting 40 cents an hour and 10 per cent increase in pay for all men getting less than 40 cents an hour.

The only demonstration made by strikers have been nightly street parades. No systematic effort has been made to picket the factories where work is going on despite the general walkout.

The manufacturers maintain that only 700 men are now striking. The national organizer says there are 2,000 striking. A sign reading "General Machinists Strike. Keep out of Dayton," was carried where passengers on trains might read Saturday.

Some companies affected by the walkout are the Dayton Metal Products Co. (the "Delco"), the Ohmer Fare Register Co., Ohio Metal Products Co., the Industrial Tool Die & Engineering Co., The Maxwell Motor Co., the Recording & Computing Machine Co., the Kidder-Oswald Co., and some smaller concerns.

Proving a Failure

Milwaukee, Wis., Aug. 29.—Judging from the tenor of reports coming from sources of all natures, the Milwaukee machinists' strike for an 8-hour day is rapidly proving to be a failure, although it may be many months before the most obstinate of the strikers will admit the futility of the attempt to force Milwaukee county metalworking shops to still further reduce the working schedule from 52½ hours a week, which was voluntarily done on July 1. It is known that a large number of men already have gone back to work and many more will do so just as soon as conditions will permit them to return gracefully. Strike leaders are no longer making broad assertions and promises as to what they will do, but seem to be on the defensive against reports published throughout the district that the men see no further use in holding out and take a chance of being in want through the long fall and winter. The employers are saying nothing, but shops are operating at good capacity and little complaint is heard, inasmuch as there has been a shortage of skilled help for more than a year's time and from then until now more men could be used than are available.

Policies Presented

Milwaukee, Wis., Aug. 29.—Each of the employes of the A. O. Smith Co., Milwaukee, numbering more than 1,850, has been presented a life insurance policy as a gift of the company. The insurance is taken out under the group insurance plan already in force in numerous large industrial plants of the country. The company pays all premiums and expenses. To further the welfare movement among its employes, the Smith company has established a motion picture theater in the main bay of the machine shop, and performances are given each Monday and Thursday noon The company is one of the largest manufacturers of pressed steel automobile frames in the world and also manufactures motor trucks, transmissions and other parts for several large car builders.

Cleveland Conditions

Since the complete victory of the National Metal Trades Association in its fight for the Variety Iron Works Co., Cleveland, the labor situation in machine shops and metal working plants generally has improved very much and is at present highly satisfactory. In the foundries, however, conditions are not so favorable and the unions are putting up a pretty strong fight for the closed shop. At the foundries of the Walworth Run Foundry Co. and the Forest City Foundry & Mfg. Co., where strikes have been on for a long time, conditions are improving and a fair force of molders is employed, but at the Taylor & Boggis Foundry Co., where the men went on a strike about two weeks ago to the number of about 200, the plant is idle, and the two plants of the Ohio Foundry Co. are also idle. Last week an injunction was obtained by Phillip and Fred Frankel, attorneys, to restrain strikers and others from interfering with workmen at the Taylor & Boggis plant, where a considerable number of the workmen did not wish to go on strike, but were compelled to do so by fellow workmen.

Suit for Damages

New York, Aug. 29.—An action to recover $50,000 which it is alleged represents the damage incurred from the recent strike and the picketing of their plants has been brought by several foundrymen members of the Bridgeport Manufacturers' Association, Bridgeport, Conn., against striking molders. Attachments have been placed on about a dozen homes of the individual molders. The plaintiffs in the suit are the Pequonnock Foundry, the J. A. Taylor Co., and the Monumental Bronze Co. The suit is based upon the decision in the Danbury hatters' case, which permitted the recovery of large damages from the hatters' union by the employer whose plant had been struck and boycotted.

Soldiers Returning to Iron Works

Men More Urgently Needed at Home Than at the Front—Ease With Which Burden of War is Being Carried in England Surprises Financiers

Bureau of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Aug. 11.

THE present week must have proved disastrous to the central powers. It is said that the enemy has done badly in the east and west, but worst of all in Gorizia, and against this series of disasters he has only to derive what comfort he can from two or three Zeppelin raids. It is increasingly evident that the day has gone by for rapid and frantic movements of troops on a large scale. The spirit here is, in the highest degree, optimistic.

Other circumstances also give ground for encouragement. The comparative ease with which the financial burden is being borne surprises even the financiers. As a newspaper puts it, we are facing the cost of the war "with the jaunty air of a young man starting on a holiday with a well-lined pocket." We are spending 35 million pounds a week and our allies are receiving from us nearly two millions a day. By next March we shall have raised for the war, exclusive of loans to allies about £2,600,000,000. It seems incredible that our financiers should take the burden so lightly; but the way it is reasoned out is that the national income is estimated at £3,000,000,000, and that our indebtedness therefore by next March will be about equal to one year's national income. The capital wealth of the country is estimated at £15,000,000,000, so that the national debt next March will represent about one-sixth of the nation's capital. It is a remarkable fact that our financial experts were never so confident as they are now. The trade returns show wonderful buoyancy and those just published are the most encouraging since the war started. The value of the imports for July was £75,772,371, which is £1,048,604, or 1.38 more than the total for the same period last year. Exports of British produce for the month totaled £46,323,057, an increase of £11,601,546, or 33.41 per cent. For the seven months the imports show an increase of 9.18 and the exports of 31.96, which is a very good showing.

The harvest prospects are considered cheerful, but the army council propose bringing back 27,000 soldiers to assist with the harvest, and in the iron trade a considerable number of soldiers are coming back to the iron works and foundries. To meet the strong demand for holidays, which are much wanted by munition workers, it is proposed to cease operations for four days in September. This plan is thought advisable by manufacturers.

Pig Iron

For the first time for some months, there are reports of slightly easier demands upon the furnaces. A surprising indication of this was a report on the Birmingham Exchange yesterday, that some Midland smelters have been accepting orders at slightly below the new figure authorized by the ministry of munitions. Naturally, this has strengthened the hands of the minority of buyers, who object to pay the advance recently imposed.

The war office is sufficiently confident in its position to release a number of ironworkers, who are now on their way back to blast furnaces, puddling furnaces and foundries. One explanation of this is undoubtedly the small output, resulting from the continuance for nearly a month of almost intolerable conditions in the iron works. Most of the works are turning out about half of their usual output, and this has so upset the calculations of the ministry of munitions that great pressure has been exercised with the object of increasing production. The answer of the makers has been that the iron and steel can only be produced through the liberation of skilled soldiers now in camp or in the fighting line. While there is still a great demand for iron, the indications are that the period of greatest stress may be regarded as over. As to ordinary pig iron, it is very doubtful whether any such pressure will again be experienced. The case is different in regard to hematite, whether produced on the east coast or the west coast; but it seems to be agreed that the measures now taken will greatly increase the output. The situation is a little easier on the east coast through the re-starting of furnaces, while on the west coast three more furnaces have gone into blast within the past week, making 30 for the combined district of West Cumberland and North Lancashire. It is hoped that recent measures will soon end the present state of strain. Certainly there has been a little easing of values within the past week. It is very obvious that great progress has been made lately in what may be called the intelligent control of the iron and steel industries, one feature of which is co-operation with the government. The manufacturers have now come to an understanding under which they consult the government before they accept oversea business of a general or private nature. In a Midland district, makers of galvanized sheets will not undertake export business before being assured that the requisite export license will be forthcoming. In view of the scarcity of material, they also insist on seeing their way to the requisite sheet bars before the order is accepted. The effect of this has been to reduce to some extent our exports. But manufacturers do not trouble about this, provided the best use is made of the material, and they are all sufficiently patriotic to admit the first claim of the admiralty and war office upon their iron and steel in a tremendous struggle like the present. On the whole, great satisfaction is expressed with the measure of success attained in supplying the world's markets while meeting the war requirements for iron and steel. It is felt that this is the beginning of a new era in the substitution of intelligent control and co-operation for the reckless competition, and the fight for individual interests, which prevailed before the opening of the war.

In addition to the shortage of labor, the spell of hot weather prevailing for the past fortnight has had a most important effect on production. Many works have been practically shut down long before noon, while the night shift has seldom exceeded two-thirds of its customary output. This has involved enormous loss, while throwing production still further behind public requirements. As showing that the heat is not altogether responsible for the lost time, a Black Country firm a few days ago summoned five puddlers for neglect of work and the stipendiary ordered three of them to pay £2 ($9.60) and two others £4 ($19.20) by way of penalty. In addition, he gave them a lecture on their lack of patriotism in failing to supply their comrades in the fighting line the requisite ammunition. "Slacking" is the great problem at the ironworks and collieries, which no step, however drastic, seems to solve.

Iron and Money: Fact and Comment

Despite Railway Labor Crisis, Financial Markets Advance United States Steel Common to Within Fraction of Par, Highest Price on Record

IN THE face of a perilous railway labor crisis, the financial markets have demonstrated their faith in the shares of the steel producers by a rise of 10 points in steel and munition stocks. The giant industrial, United States Steel common, has led the market with an enormous turnover of shares, last Wednesday selling up to the hitherto unprecedented price of 99⅜. In the boom of 1909 the stock changed hands at 94⅞, but between the two dates it was down as low as 38. The rise undoubtedly is warranted on the basis of value. Permanent dividend capacity of the Corporation has been increased greatly as the result of strengthening of resources made possible by the current extraordinary conditions in the steel trade. Asset value affords the only approximate guide to the trend of Steel common. By the close of 1916 the asset value will certainly be in excess of $110 a share, as compared with $77 a share at the close of 1915. In past years, no industrial stock has ranged more closely in market value to asset value than Steel common.

The general business situation has changed but little in weeks or even months past. The same persistent demand from the outside world for the products of our fields and mines and mills continues to shift the liquid wealth of Europe to America. The most notable new element to be considered is the entrance of Rumania upon the battle stage. Founded as our present business activity is upon the war, a development of such potential importance is worthy of no little attention. If Rumania's intervention is to hasten the end of the conflict, buyers and sellers in America's markets will give it a prominent place in their calculations.

Quotations on leading iron and steel stocks at the close of the New York stock exchange on Aug. 26 and net changes for the preceding week are shown in the following table:

	Close Aug. 26.	Net chg.
American Can	60	+ ⅞
American Can, prfd.	111½	+ ½
Amer. Car & Fdy.	62	+ ⅜
Amer. Car & Fdy. Co., prfd.	117¼	+ ¼
American Locomotive	77	+4⅞
American Locomotive, prfd.	105	+1
American Steel Foundries	54	— ½
Baldwin Locomotive	80½	+4⅜
Baldwin Locomotive, prfd.	104⅝	— ⅜
Bethlehem Steel	489	+19½
Bethlehem Steel, prfd.	137	+2
Colorado Fuel & Iron Co.	48¾	+ ¾
Continental Can	97	—2
Continental Can, prfd.	107½	+ ½
Crucible Steel	77½	+4⅝
Crucible Steel, prfd.	118	.....
General Electric	171	+ ¾
Gulf States Steel	75	—3
Gulf States Steel, 1st prfd.	95	.....
Gulf States Steel, 2d prfd.	85	—2½
International Harv. of N. J.	115	— ½
International Harv. Corp.	79	+ ½
Lackawanna Steel	76¾	+1¼
Nat'l Enamel. & Stmp. Co.	24¾	+1¾
Pressed Steel Car	53½	+ ¾
Pressed Steel Car, prfd.	101	+1¼
Pullman Palace Car	167	.....
Republic Iron & Steel	53½	+2½
Republic Iron & Steel, prfd.	113¾	+ ¾
U. S. C. Iron Pipe & Fdy.	20	—1¼
U. S. C. I. P. & Fdy. prfd.	53	.....
United States Steel	97⅛	+5⅞
United States Steel, prfd.	118	.....
Westinghouse Mfg.	60	+ ⅞

Following is a table comparing maximum quotations of iron and steel stocks not listed on the New York stock exchange at the close Aug. 25 and Aug. 18:

	Aug. 25.	Aug. 18.
American Radiator	390	392
American Ship Building	50	50
Cambria Steel	82	82
Chicago Pneumatic Tool	73	69
LaBelle Iron Works	60	54⅜
Lake Superior Corp'n	11½	10⅞
Stewart-Warner Speed. Co.	111⅞	105
Warwick Iron & Steel	9½	.....
Westinghouse Air Brake	150	143¾
Westinghouse Elec. & Mfg.	61⅜	60

Lake Superior Corporation Earnings

The subsidiary companies of the Lake Superior Corporation gave a better account of themselves in the fiscal year ended June 30, 1916, than in the previous 12 months. In fact, their profits were the largest they have ever reported for a single year. Their aggregate net earnings were $3,503,471, as compared with $1,366,210. The income was so disposed of, however, that the return to the Lake Superior Corporation was smaller than usual, earnings remaining in the hands of subsidiaries in the form of enlarged reserves and balances. The current year is expected to show much better results, as realization of profits from war business began late in the last fiscal year and are understood now to be in full volume. Improvements and additions to the property of the Algoma Steel Corporation, Saulte Ste. Marie, Ont., provide greater earning power. The income accounts for the past two fiscal years compare as follows:

	1916.	1915.
Net earn. sub. cos.	$3,503,471	$1,366,210
Prev. def.	331,765	*61,931
Total earn.	$3,171,706	$1,428,141
Bond int.	1,513,539	1,166,414
Disc. and exp. of secur.	206,680	62,000
Sink'g fund	667,173	134,424
Res., dep., etc.	425,595	54,210
Int. & divs. p'd to L. S. Corp.	.....	342,859
Surplus	$358,718	†$331,765

*Surplus. †Deficit.

The pig iron output of the Algoma Steel Corporation last year amounted to 258,504 tons, compared with 272,917 tons the previous year; steel rails, shell steel and merchant steel, 215,416 tons, compared with 174,436 tons.

Financial Crop Ends

The syndicate of eastern capital which has been negotiating for control of the American Vanadium Co., Pittsburgh, is understood to have secured options on more than enough stock to swing the transaction. The syndicate is offering $7,000,000 for the company, or $1,000 for each of the 7,000 shares outstanding, the American Vanadium Co.'s capital stock being $700,000. A new company is being forced to take over the properties which are at Kirwan Station, near Bridgeville, Pa. This company will have an authorized capital stock of $11,000,000, and will issue short term notes to the amount of $2,500,000. The shareholders of the American Vanadium Co. have been offered $650 in cash and $350 in these notes for their holdings. James J. Flannery, president of the present company, owns more than controling interest. He will become chairman of the board of the new company, while J. Leonard Replogle, at present a vice president, will become president. The new stock will be underwritten by a syndicate composed of Kuhn, Loeb & Co., Cassat & Co., Philadelphia; J. L. Replogle, Chandler Bros. & Co., Harrison Williams and others.

* * *

Directors of the Federal Dyestuffs & Chemical Co. have elected to the presidency George T. Bishop, president of the Washington, Baltimore & Annapolis railroad. They also have chosen Ralph L. Fuller, who recently sold his interest in the Harshaw, Fuller, Goodwin Co., Cleveland, to fill the vice presidency. This company has its plant at Kingsport, Tenn., and is making a general line of dyes. It has ceased to fill war orders.

Steel Company's New Plant

The Warren Steel Co. has purchased 11.15 acres for its new plant which is under construction at the Iron Mountain tracks at Fyler avenue, St. Louis. The tracts were the last three which the company needed.

The Warren company has been located at Lyon and Dorcas streets, St. Louis, and when extending business necessitated larger facilities and a new location, considerable pressure was exerted to have the company locate in another city, but this was unavailing.

The plant will be equipped with electric power, and all smelting and polishing will be done by electricity. The Mississippi Power Transmission Co. has installed a high-tension line for eight miles from its transformer station at Page avenue and the Wabash tracks.

Bolt Works is Expanding

The Michigan Bolt & Nut Works of Detroit has begun the erection of a 2-story addition to its plant in Detroit. The new structure will be 80 x 120 feet, of reinforced concrete construction, and when completed will be given over to the stock, packing and shipping departments. The increasing business of the company made the erection of the new building imperative. The company is one of the oldest manufacturing concerns in Michigan, having been incorporated in 1860 as the Michigan & Indiana Bolt & Nut Works with a capital stock of $20,000. Later the company incorporated as the Michigan Bolt & Nut Works with a capital stock of $100,000, which has since then been increased to $300,000. The present officers are L. L. Barbour, president; F. S. Bigler, vice president, treasurer and general manager, and R. H. Hill, secretary. The company manufactures carriage and machine bolts and nuts, lag screws, forged turnbuckles, drop forgings, and special forgings. A process for cold-heading smaller sizes of bolts has been developed and is now in operation.

Will Add Mills

The tin plate mill of the Pittsburgh Sheet & Tin Plate Co., Pittsburgh, at Marietta, O., was put into operation Aug. 15. Owners of the plant, formerly controled by eastern capitalists, plan to install six additional tin mills, which will give the company a total of 10 mills for rolling tin plate and tin mill sizes of black sheets. Larkin C. Taylor, president of the Baird Machinery Co., Pittsburgh, is head of the Pittsburgh Sheet & Tin Plate Co.; E. Cooper Shapley of the Commonwealth Trust Co., Philadelphia, is vice president; M. J. Richards, formerly superintendent of the Standard Tin Plate Co., Cannonsburg, Pa., is general manager and W. E. Gnann is manager of sales. It is stated that approximately $500,000 will be spent for extensions and improvements.

Obituaries

John Noey, who died last week in the Mercy hospital, Pittsburgh, was one of the oldest department superintendents in the Edgar Thomson works of the Carnegie Steel Co. at Braddock, Pa. He was a protege of the late Captain William R. Jones and was taken by the captain to Braddock in 1874 to build the Edgar Thomson works; and until his illness about a month ago was the superintendent of motive power and boilers at the plant. Mr. Noey was one of about 50 who

JOHN NOEY

were Andrew Carnegie's junior partners, beneficiaries of a fund established in recognition of the valuable services of the original employes, in his first steel works. Mr. Noey was born in Johnstown in June, 1850, and was the son of John Noey Sr., one of the pioneer employes in the plant of the old Cambria Iron Co., now the Cambria Steel Co., at Johnstown, Pa.

Senator Francis T. Frost, of Smith's Falls, Ont., president of the Frost & Wood Co., manufacturers of agricultural implements, died suddenly from a paralytic seizure Aug. 25, aged 72 years. He had been in failing health for some time.

Emil Hereter, for 30 years chief mecanical engineer of the Thomas Edison laboratory in West Orange, N. J., and who worked on many of Mr. Edison's important inventions, died at West Orange, August 23. He was 59 years of age and a member of the American Society of Mechanical Engineers.

George B. Roberts, a pioneer manufacturer of steam boilers, died recently at Marblehead Neck, Mass. Mr. Roberts was born in Boston in 1833. At one time he was a partner in the old Cambridge, Mass., firm of Kendall & Roberts, and later was the organizer of the Roberts Iron Works, Cambridgeport, Mass.

Alan Bruce Stewart, formerly head of the bonus department of the Reed-Prentice Co., Worcester, Mass., was killed on the battlefield in France, last month. He was a member of the 98th Canadian battery, heavy artillery, and was in the trenches, fighting against the German army, when struck by a flying shell from the enemy's lines. Mr. Stewart, who was 37 years old, was a Scotchman and enlisted in Montreal last September.

Killed in France

Harold Lomas, for over 13 years a member of the sales department of the Crocker-Wheeler Co., was killed on July 1 in the British drive, Friecourt, France. Mr. Lomas served the Crocker-Wheeler company as manager of its Denver office and also as manager of its Baltimore office. At the time of his death, he was holding the rank of first lieutenant in the 20th Manchester regiment.

Youngstown's New Hotel

The new Willis Hotel Co. has announced that plans have been completed for the erection of a $500,000 hotel at Wood and Phelps streets in Youngstown, O. The company is composed of Cleveland and Youngstown interests and is capitalized at $700,000, with Randall Montgomery, Youngstown, president; W. H. Park and W. I. Davis, Youngstown, vice presidents; Fred E. Harmon, Cleveland, secretary; John E. Androp, Youngstown, assistant secretary; G. A. Tenbusch, Cleveland, treasurer, and F. A. Parmalee, Youngstown, assistant treasurer.

The structure will be 72 x 100 feet, 13 stories, and will be of reinforced concrete and steel construction, with accommodations for 520 guests. Engines, an ice plant, a laundry and a mechanical ventilating system will be installed. Contracts will be awarded within a month and work on the structure will be commenced within 60 days.

The Foster Machine Co., Elkhart, Ind., has increased its capital stock from $150,000 to $500,000.

Chinese Markets for Iron and Steel

Some Practical Suggestions on How to Extend American Trade Into the Republic—Peculiarities of the Land That is Awakening

BY JOSEPH KING GOODRICH

TO SAY that China possesses enormous resources in coal and iron, is to perpetrate a mere truism; because every writer from the pioneer missionaries in the early centuries of our era down to the present day, who has taken the trouble to discuss the economics of that great country, agrees with all his fellow authors in making that statment. Furthermore, all those writers admit that the Chinese, from the dawn of their history, have known how to make some use of those resources, if it was only in a most crude way. But such resources, until developed, mined, and properly valorized according to present-day standards, are of practically little importance. They remind us very much of the man who found himself on the verge of starvation in London, although he had in his pocket a Bank of England note for one million pounds sterling! He could not get his note changed; he could not realize his assets; he could not market his resources. Until China has reached the point when she can realize to the full her resources and manufacture all the ironware she needs, the opportunity is for us.

Until China is able adequately to realize her assets in coal and iron, they will be of little practical value to her people; and until that full realization is achieved—something now most remote—is the chance for the American manufacturer. Especially is the present time propitious because of the enforced withdrawal of nearly all European competition. It is true that some of China's iron and coal deposits have been opened and worked with profit; although the latter factor—profit—is of but little moment when compared with what similar effort in this country and elsewhere has accomplished. Not to mention such enterprises as the Peking Syndicate's establishment in Honan province and several others, would be a display of ignorance quite unpardonable. It is true, also, that at present China exports some coal; but here, again, this is no criterion by which to measure her development of natural resources; because that coal is taken to countries whose people know how to make use of it in arts, or industries, and that is certainly something which very few Chinese have yet learned to do.

The generally accepted estimate of China's population — that is for the whole of the republic, including China proper, Manchuria, Mongolia, Eastern Turkestan, Tibet, and all dependencies—of 400,000,000, is undoubtedly greatly exaggerated, as will assuredly be demonstrated when an accurate census is taken. Competent authorities never accept those figures: some cut them down to 250,000,000; none, I believe, go higher than 300,000,000. During the year 1913 (the latest for which itemized statistics are available) 14,932 long tons of iron and steel, from pig to finished lines (but excluding machines), valued at $6,273,264, were imported into China from all other countries that supplied any portion of that total. If we take the very minimum of the estimate of population, 250,000,000, we have an import of only about two and one-half cents per capita; the merest trifle. Yet —bearing in mind that the value of China's total imports of every sort and kind, and from all countries, during that same year of 1913, was only 18 cents per capita; and that in this, even, there was considerable opium—$27,000,000 in value, it is manifest that iron and steel, other than those products used in the making of manufactured tools, implements, machinery, etc., were of some considerable relative importance.

But what interests us especially is the share that the ironmasters of the United States had in that import; and this, I am sorry to say, was almost negligible. The figures given should stimulate all ironmasters, who are contemplating an entry into foreign fields, to secure for themselves the opportunity now offered them for completely changing the position of the United States as it has been related to those of the European countries for some years, and more recently to that of Japan.

No attempt is made here to discuss the enormous possibilities for those who use iron and steel in the manufacture of all kinds of wares and machinery—domestic or industrial—that the Chinese are rapidly coming to consider almost as essential in their domestic and public economy as do the people of the suburban districts throughout this hemisphere, all through Europe, and in many parts of Africa, as well as of Asia besides China.

Without intention of trespassing upon the jurisdiction of export managers, who should know very well how to conduct their firms' business, a few suggestions as to how it is probable our exporters may secure a tangible share of China's trade in iron and steel manufacturers, are given here as the result of some actual experience and of great and varied observation.

The republic, or empire, of China is altogether too large a field for any one ploughshare to work satisfactorily, no matter how competent may be the hand which guides the share. Indeed, I have no hesitation in saying that it is impracticable (when it is not impossible) for any individual representative of an American manufacturer and exporter properly to canvass even one of the five great units which compose the Republic of China. I mean, of course, the 18 provinces which compose China Proper —from Chihli on the north to the two Kwangs on the south, and from Chekiang in the east to Szchuen in the west; to which principal unit are to be added the four subordinate ones: Manchuria, Mongolia, Kangsu and Chinese Turkestan, and Tibet.

Most people, quite naturally, form their opinion as to what China is as to its physical conditions in the northern and western sections of the great country that we call by the general and inclusive (but absolutely incorrect) name of "China," from what those regions are made to appear on maps which should long ago have been discarded as obsolete. It is much less than 10 years since the possibilities of those great western sections of China began to receive the careful attention from the Chinese themselves that they richly deserve, while, of course, they were totally ignored by the merchants and industrialists of America and Europe. As a matter of fact, there is not one of the five major states that form the Republic of China which is not a wonderfully attractive field for the iron and steel manufacturer and exporter. There is one single item, wire or cut nails, which is now in such demand that the visible and prospective supply for the next six months is entirely inadequate to satisfy the immediate demand; and that demand is daily growing. Another item which offers a market of almost indefinite proportions is sheet steel.

Were this statement as to the certainty of good markets in the remote western and northtwestern parts of

China not correct, why would there be, at the present time, so many representatives of Russian firms in those fields? Russia is not really able to supply her own domestic demand for manufactured iron in smaller articles; and yet the prices which are obtainable in Mongolia and Chinese Turkestan are so high and the demand so great, that the incentive to export from the meager supplies at home tempt Russian merchants to send some parts thereof into the neighboring regions of China from Siberian towns. Why, too, should the British iron merchants, so far as existing conditions permit, be struggling hard to secure and retain a monopoly of these broad fields?

The all important question asks itself automatically; what is the best way for our American manufacturers of iron and steel in almost every variety to go to work to try for a share of this trade before it is too late to accomplish anything satisfactory? Russia cannot adequately supply the demand. Germany is completely shut out from the market for the present and for an almost indefinite future. Belgium is entirely unable to do what she did before the outbreak of the war.

How to Get Trade

The answer is not difficult to formulate. First, determine which one of the five principal divisions of China shall receive attention. Of China proper, it is only fair and wise to say that this particular territory is pretty well occupied by our own representatives or those of Great Britain and Japan, with Germans doing what little they can, except in the far north and the extreme west. Hankow, on the Yangtze river, and very nearly at the geographical center of the eighteen provinces, seems to be the natural point for establishing an operating force, as it commands the waterways and highroads into the north, west and south.

For easternmost China, and for the northeastern region, Shanghai and Tientsin are, respectively, the logical centers for operations. The former caters to a large area in which are numerous cities and towns; while the population of that region is very dense and the inhabitants remarkably advanced in their ideas of living gaged by our own standards. The latter, Tientsin, is the entrepot for the metropolitan province of Chihli, wherein is Peking, and a great region stretching far towards the northwest along the railroad which is being built from the capital to Urga by way of Kiakhta, to Siberia. Much of eastern Mongolia will naturally draw its supplies of imported goods from Tientsin; as will the extreme western part of Manchuria.

In Manchuria proper, it is advisable to establish headquarters at Mukden rather than at Dalny, Antung or Newchwang, for two reasons; first, in order to be more centrally located—for if southern Manchuria is valuable, northern Manchuria, with its wonderful agricultural and grazing possibilities, and its proximity to the Eastern Mongolian coal fields, is priceless—as well as to be able to reach the entire territory right away up to the Siberian frontier, also east and west; and second, to get at least a little bit away from Japanese competition and jealousy in contending that all of Manchuria is their peculiar bailiwick.

It will be difficult for some time to secure a firm footing in Mongolia, but by no means impossible; because the Chinese government has voluntarily opened for trade with foreigners (the permission carrying right of residence) certain towns in the eastern part; and since Russian merchants are established in Outer Mongolia, no good reason for Americans being deprived of equal privileges can be given. Urga would be the logical headquarters, and this town can now be reached by way of the trans-Siberian and the soon-to-be constructed branch southward from Verdne—Udinsk or Baikal through Kiakhta. It is intended in the near future to extend this line until it meets that which is being built northward from Peking, and which is already in operation to To-tung-fu, more than two-thirds of the way from the capital to the great wall and the Mongolian frontier. When the railway from Urga to Uliassutai — now being actively built by Russian concessionaires —is opened, there will be great possibilities for the American pioneers.

If the cream is to be skimmed from the Chinese Turkestan pan—that great mineral, grazing and agricultural region along the eastern foot of the Altai, Tien-shan, and other ranges that bound Chinese and Russian territories, and stretching well into China—it is by all means advisable that commercial headquarters be established promptly at Kashgar, Kuldja and Yarkand. Objection to such enterprise may be raised on the ground of inaccessibility and difficulties of transportation; but others have satisfactorily overcome these obstacles in a small way, and it would be to the everlasting disgrace of our American champions of industry if they confessed themselves unable to overcome in a large way.

Tibet is, of course, still closed against all non-Chinese traders; it being contrary to our principles to recognize as "traders" the many smugglers who slip across the Tibetan frontiers on all sides and do a most remunerative, if petty, business. But it cannot be long until the progressive Tibetans (and there are such, although most of the world declares it to be impossible) and the many broad-minded Chinese, demand free access for all comers to that now secluded country, with full permission to buy and sell at discretion.

Kind of Men Needed

If an American company or firm seriously contemplates entering the markets of the Republic of China, it would be well for it to secure the services of a middle-aged man who is thoroughly familiar with the ways of the great world through extensive travel. He must be a person who (if he has'nt it already) can in a few months acquire a fairly comprehensive knowledge of the business and its capabilities for expansion. Then let him go to China and—if he is exceptionally discreet—let him settle down for awhile in Shanghai, Canton, Hankow or any of the established commercial centers, to study the whole field of the republic and the probabilities in the particular line he represents. If there is danger of indiscreet talking (and that probability is the main reason for not selecting a young man to be the pioneer), let this *avant courier* keep away from the great marts where there are so many old hands; a part of whose business it is to find out what the newcomer is about and block his game.

With the knowledge that a short sojourn in one of the centers will bring, this pioneer will be able to decide on one particular major division as being promising; he will have secured the services of an interpreter; and he will then move on into the interior actually to open a business office. In from three to six months, this should be going smoothly enough to justify calling on the home office for a young man to come out and be the permanent manager. Then the "pioneer" will move on to another field and repeat the operation. In due time someone of the newer, younger men will be able to take the place of the "middle-aged pioneer," who should be recalled and retired on a living pension.

American business houses in China (as in Japan and nearly everywhere in the east) must soon learn to conduct negotiations for purchases or sales, contracts, and all other matters, direct with the Chinese and without the intervention of an interpreter. The sooner young men are established at the various headquarters to master the local dialect, the better. It is not a very difficult task to learn colloquial Chinese —not one-quarter so much so as it is to learn Japanese well—and the few firms (mainly German as yet), who have had the wit to follow this course, already know what a handsome addition is made annually to the right side of profit and loss by the elimination of My Lord Compradore.

Bethlehem, G. E. and Pennsy Buying

Activities of the Machine Tool Market Center Around Lists Issued by These Companies—Cranes Are Eagerly Sought

THE eastern machine tool market is featured by a fairly active demand from domestic sources. Most of the requirements now being placed are comparatively small, but involve a fair total in the aggregate. The largest part of this inquiry stipulates the earliest delivery possible, with the result that such concerns as are sold well ahead are not sharing extensively in the business. Orders placed during the week came from concerns in a great many lines of industry, but no single transaction was of special importance. The biggest pending business now before the trade is comprised in the requirements of the Bethlehem Steel Co. and the General Electric Co., as noted last week. The former concern has not yet closed on a large number of tools to be installed in several of its plants. The latter company continues to issue inquiries almost every day and it now has taken bids on at least 75 tools on which no action has been taken. These tools are destined to be installed in the Schenectady, N. Y., and Fort Wayne, Ind., plants of the company. Some additional machine tool business has been placed from Russia, France and Italy, but this did not reach as large proportions as in previous weeks.

A careful review of prices shows that the present quotations on the general run of machine tools are approximately 30 to 40 per cent higher than before the European war, while on the standard makes of lathes, quotations are about 60 per cent higher. Some makers point out the fact that the advances in machine tools are much smaller than the advances which have been asked on heavy equipment, such as cranes. Prices on cranes now are approximately 100 per cent higher than they were two years ago and in some cases the increases are as much as 125 per cent. The crane market is active and one crane interest voices the opinion that there are not enough shops in the country to make the cranes which, from present indications, are to be bought during the coming year. The Central Railroad of New Jersey is in the market for a 20-ton transfer bridge. The Pennsylvania railroad is in the market for a 30-ton electric traveling crane, the General Electric Co. is taking bids on one 20-ton, one 15-ton and two 10-ton cranes. The Clyde Motor Truck Co., New York, shortly will erect a plant at Farmingdale, L. I. Rome Brass & Copper Co., Rome, N. Y., is about to build a new rod mill. Brown & Sharpe Mfg. Co., Providence, R. I., is preparing to erect an addition. Tinius Olsen Testing Machine Co., Philadelphia, will erect a four-story addition. International Steel Treating Co., Philadelphia, will build a plant at Darby, Pa. Stanley Works, New Britain, Conn., is about to start work on a good-sized addition. Lovell Mfg. Co., Erie, Pa., will build a new wire mill. Autocar Co., Ardmore, Pa., will build a fair-sized addition. Maryland Metal Cross Tie Co. is having plans revised for the extensive plant it proposes to build at Havre de Grace, Md. The Nathan Mfg. Co., New York, has let a contract for the erection of a plant at Flushing, L. I., to cost about $500,000. Hunt-Spiller Corporation, Boston, will erect a new foundry. Abrasive Machine Tool Co., Providence, R. I., is about to extend its plant. American Tube Co., Woonsocket, L. I., will erect a new plant. American Locomotive Co. will build an extensive addition to its plant at Richmond, Va. Howe Scale Co.'s plant at Rutland, Vt., is being enlarged. Williamsport Wire Rope Co., Williamsport, Pa., has let a contract for the erection of a large addition.

Second-Hand Dealers Uneasy

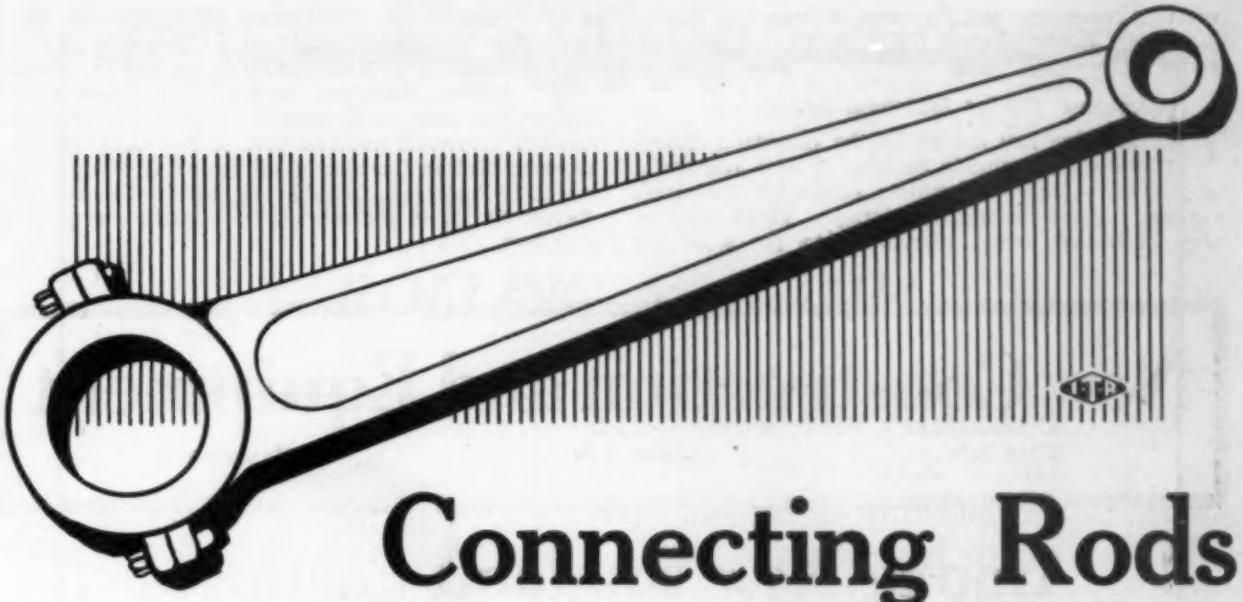
MACHINE tool buying in Chicago is more or less irregular, owing to the season and the uncertainty of the future. Inquiry from domestic users continues on a moderate scale, without any outstanding features. Business is mostly for one or two machines and emanates from a variety of users. Several concerns, recently organized to build farm tractors, are buying their equipment and are well satisfied to obtain January to March delivery. Comparatively little machinery can be contracted for delivery before January. The only export demand now entertained is from Canadian buyers, who are seeking 24 to 36-inch lathes for munition work in lots of 30 to 50 machines. It has not been possible to obtain the larger sizes except in a few instances where second-hand tools were available, and it is believed nothing larger than 24-inch lathes have been obtained in any quantity for this purpose. Dealers who have loaded up with second-hand tools are watching the market closely, as prices on this class of equipment have declined sharply and indications are they will not return to former levels unless an unusual spirit in shell-making equipment occurs.

Cincinnati Market Quiet

THE English government has given several good orders for drilling machines to Cincinnati tool builders in the past week. Cincinnati plants are able to make deliveries on lathes, drilling machines and milling machines in 30 to 60 days. This is in marked contrast to deliveries quoted a year ago at which time shipments could not be promised inside of six or eight months.

Pennsy's List Enlivens Pittsburgh Market

THERE is an encouraging inquiry for machine shop equipment and small capacity electric traveling cranes in the Pittsburgh district. Several dealers report a number of fair-sized inquiries for lathes, with 26 to 48-inch swing. The Pennsylvania Lines West has issued an inquiry for approximately 50 machine tools, including two 100-inch boring mills, two 6-foot radial drill presses, one 600-ton 90-inch driving wheel press, one 60-ton vertical driving box and rod press, about 15, 16 to 60-inch lathes, two forging machines, three high-power turret lathes, one cold saw, one guide-bar grinding machine, three planers, several heavy-duty drill presses, four or five small boring mills, two rod-boring machines, one traverse head shaper, one 24-inch horizontal boring and drilling machine and a number of pneumatic tools. The H. Koppers Co., Pittsburgh, is inquiring for about 12 machine tools for shop purposes, to be used at the plant of the Seaboard By-Products Coke Co., near New York. It is understood that the Standard Engineering Co., Ellwood City, Pa., is asking for bids on



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Chicago Office: Room 1511-12 Lytton Bldg., 14 East Jackson Blvd. A. Schaeffer, District Representative
Philadelphia Office—902 Widener Building. Frank Wallace, District Representative

AGATHON STEELS

traveling cranes and the Firestone Rubber Co., Akron, O., also is in the market for a number of traveling cranes.

Cleveland Market Maintains Steady Gait

THE machine tool market in the Cleveland district continues to maintain the pace it set a few weeks ago. The volume of business concluded last week was again above the normal average. There were no large individual orders placed during the week but the many lines of manufacture represented in these sales show the healthy condition which exists. Lathes find a ready sale if immediate delivery can be guaranteed. Milling machines, boring mills, planers and shapers continue to be eagerly sought. Information reached Cleveland machine tool dealers early Monday morning that an increase on all Brown & Sharpe tools might be expected. The F. H. Weeks Lumber Co., Akron, O., is in the market for a lathe for general purposes.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

BAR MILLS, ME.—The Fiske-Carter Construction Co., Worcester, Mass., has been awarded a contract for a reinforced concrete, 2-story and basement, 56 x 128-foot building and a 3-story, 30 x 60-foot building for the National Fibre Board Co.

PORTLAND, ME. — The American Ship Co. has been incorporated with $1,000,000 capital by Benjamin B. Sanderson, E. V. Mann, E. E. Huston, M. F. Day and A. E. Locke.

PORTLAND, ME. — The Corporation Finance Co. has been incorporated to do manufacturing, engineering, general mining construction. The company is capitalized at $350,000 by Albert F. Jones, A. B. Farnham, and James E. Manter.

MANCHESTER, N. H.—The F. R. Atwood Box & Wood Mfg. Co. will build a 1-story and basement, 50 x 150-foot factory and a brick, 1-story, 24 x 40-foot boiler house to cost $40,000 at its plant at Valley View, East Manchester.

SOMERSWORTH, N. H.—Plans are being prepared for a brick, mill-construction, 1-story, 100 x 30-foot dye house and a brick, 3-story, 20 x 30-foot addition to the woolen mill of the Great Falls Woolen Co. to cost $25,000.

RUTLAND, VT.—The Howe Scale Co., it is understood, is about to pass into the hands of a syndicate which is taking over a number of scale plants throughout the country. The Howe plant will be continued at Rutland and will be considerably enlarged. Some of the proposed additions already have been started.

ABINGTON, MASS. — The New York Photo Co. has awarded a contract for a brick, 2-story, 40 x 125-foot factory.

ATTLEBORO, MASS.—The Frank Mossberg Co. will build a brick, mill-construction, 1-story, 150 x 200-foot building and an 80 x 120-foot factory building at its plant.

BOSTON.—The Plymouth Rubber Co. will build a reinforced concrete, 2-story, 100 x 150-foot addition to its plant.

BOSTON.—J. Noble will build a 2-story, 25 x 70-foot building for light manufacturing at 158 Dover street.

BOSTON.—M. & C. E. Wyzanski are having plans prepared by Monks & Johnson, engineers, 78 Devonshire street, for a 2-story and basement, 25 x 100-foot service building to be leased to the Philadelphia Storage Battery Co.

BOSTON.—The Drake Bros. Co. will build a brick, mill-construction, 2-story, 45 x 97-foot addition to its plant on Savin street, Roxbury.

BOSTON.—Robert Hamilton will build a reinforced concrete, 2-story, 60 x 125-foot building at Bowdoin and Delano streets, Dorchester.

BOSTON.—Plans are being prepared for a brick and stone, 10-story, 50 x 103-foot office building to cost $250,000, for Charles H. Ditson at 178 Tremont street.

BOSTON. — The Hunt-Spiller Corporation, 383 Dorchester avenue, South Boston, has let a contract for the erection of a 1 and 2-story, 50 x 70-foot, foundry addition.

BOSTON.—A. O. Norton, manufacturer of lifting jacks, has bought a large site on Brookline avenue between Smyrna and Binney streets and contemplates the erection of a fireproof factory building.

BOSTON.—The Weco Mfg. Co. has been incorporated to make electric and gas heating appliances with $50,000 capital by William H. Williams, Harry B. Eaton, Waban, Mass., and D. H. Fisher.

CAMBRIDGE, MASS.—Morey & Co. will build a reinforced concrete, 5-story store and office building and a mill-construction, 2-story storage building on Commercial street.

CHARLESTOWN, MASS. — Bids have closed for a reinforced concrete, 8-story, 70 x 301-foot warehouse for Lawrence Wiggin, Boston.

CHELSEA, MASS.—The Market Forge Co. is about to let a contract for the erection of a 2-story, 48 x 200-foot plant at Everett, Mass.

EVERETT, MASS. — The New England Bolt Co. has been incorporated by William E. Clark, Kenneth T. Burr and Edgar W. Blodgett.

GARDNER, MASS.—The Gardner Business Men's Association will build a 3-story, 60 x 150-foot factory for new industries, one of which will be Henry R. Judkins, Orange, maker of machinery.

LEOMINSTER, MASS. — The Ford & Lyons Co., Fitchburg, Mass., will build a 2-story, 40 x 100-foot addition to its factory off North Main street for making inner tubes.

LOWELL, MASS. — The Lowell General hospital will build a brick, fireproof, 2-story and basement, 40 x 180-foot ward building to cost $125,000 on Varnum avenue.

MALDEN, MASS.—The Malden Biscuit Co. will build a brick, mill-construction, 2-story and basement, 40 x 80-foot factory on Centre street.

PEABODY, MASS.—Louis Verza has let a contract to John O. Ballentine for the erection of a 3-story, 40 x 200-foot factory building.

PEABODY, MASS.—The A. C. Lawrence Leather Co. will build a brick, 7-story, 500-foot factory building at its plant to replace the wooden buildings.

QUINCY, MASS.—Fire destroyed the main building of the Wollaston Foundry Co. causing a loss of $30,000.

QUINCY, MASS.—The Bay State Street Railway Co. has filed plans for a structure which will double the capacity of the company's power plant. Five additional turbine engines will be installed.

SPRINGFIELD, MASS. — The Casper Ranger Construction Co. has been awarded a contract to erect a $200,000 factory building for the Bosch Magneto Co. in Brightwood.

SPRINGFIELD, MASS.—Plans have been completed for a brick, 3-story, 30 x 100-foot addition to the building of the New England Telephone & Telegraph Co. at Dwight and Worthington streets, to cost $125,000.

SPRINGFIELD, MASS.—The Motor Industry Appliance Co. has been incorporated to make carburetors with $60,000 capital by Anton Schmelzer, Frank W. Arthur, Ralph S. Miles and Benjamin F. Arthur, Holyoke.

UXBRIDGE, MASS.—A. D. Windle, of the Windle Wool Scouring Co., West Millbury, will build a 2-story, 40 x 120-foot factory and install $15,000 worth of machinery.

WATERTOWN, MASS.—The Hood Rubber Co. will build a 1-story, 144 x 450-foot tire building at East Watertown.

WATERTOWN, MASS.—The government has appropriated $500,000 for the erection of a gun carriage manufacturing building at the Watertown arsenal. An appropriation of $215,000 has been granted for a projectile

The Return of

ROLLING MILL JIM

Stopped at the Hubbard on the way back from my fishin' trip. Say—I guess they've got some Roll Shop with those new Air Furnaces and fifteen new Lathes. Take it from Old Jim that there was somethin' in every one of those lathes that there was Real Class to. I had to catch a "Jitney" to make my train 'cause I couldn't take my eyes off of 'em. If you don't have time to stop there and look for yourself, order some rolls from 'em, they'll look the same in your lathes.

So long—

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Directory, page 228.

machine shop and $12,000 for a new power plant.

WATERTOWN, MASS. — Plans will be ready to figure early in September for a concrete, 1-story, 144 x 450-foot tire building for the Hood Rubber Co. in East Watertown.

WORCESTER, MASS.—Charles F. Stevens will build a brick, store and office building and an auto service station to cost $150,000 at 670 Main street.

WORCESTER, MASS.—The Central Building Co. has been awarded a contract for a brick and reinforced concrete, 1 and 2-story, 97 x 116 x 394-foot building for the Packard Motor Car Co., Boston, to cost $90,000, at Shrewsbury and Aitchison streets.

AUBURN, R. I.—The United Wire & Supply Co. has acquired six acres at Auburn and is erecting a 200 x 340-foot plant with two 2-story wings. The company, which manufactures plated wire, brass tubing and a special line of automobile parts, expects to concentrate in the new plant all of its operations which now are conducted at two plants in Pawtucket and a third plant at Auburn.

CENTRAL FALLS, R. I.—The Hemphill Mfg. Co. has awarded a contract to the Humes Construction Co., for brick, 2-story and basement, 25 x 25-foot and 38 x 150-foot additions to its plant.

CRANSTON, R. I.—The Universal Winding Co. will build a brick and steel foundry to cost $40,000 and a wood and iron storehouse at its plant at Elmwood and Gardner avenues.

EAST PROVIDENCE, R. I.—The Nonnabo Chemical Co. will build a 2-story, 60 x 240-foot, nitrating building.

PROVIDENCE, R. I.—The Abrasive Machine Tool Co. is erecting a 1-story, 52 x 151 and 25 x 30-foot plant at East Providence.

PROVIDENCE, R. I.—The Electric Systems Corporation has been incorporated to make machines and mechanisms with $100,000 capital by Harry M. Mays, Arthur C. Stone, George Briggs Jr., and Alton E. Stevens.

PROVIDENCE, R. I. — The Brown & Sharpe Mfg. Co. is having plans prepared by W. T. Hatch, engineer, for a 1-story, 72 x 170-foot factory building to be erected at Leland and Promenade streets.

WARREN, R. I.—The Mt. Hope Spinning Co. has been incorporated to make automobile tire thread with $175,000 capital and has taken over No. 3 mill of the Cutler Mills.

WOONSOCKET, R. I. — The American Tube Co. has let a contract for the erection of a factory building to cost about $175,000.

BANTAM, CONN.—The Bantam Anti-Friction Co. has let a contract for the erection of a 3-story, 50 x 100-foot addition.

BRIDGEPORT, CONN.—Bids have closed for a reinforced concrete, 8-story warehouse for the Bridgeport Storage Warehouse Co. on Whitney street.

BRIDGEPORT, CONN. — The Bridgeport Christian Union will build a brick, fireproof, 4-story, 87 x 100-foot building to cost $60,000 at 24 Bank street.

BRIDGEPORT, CONN. — Davis & Dane are preparing plans for a 2-story plant to be erected for Charles Gregory, 236 Middle street.

BRIDGEPORT, CONN.—The Feeney Tool Co. has been incorporated with $40,000 capital by John M. Feeney, Michael Feeney, John Cremin and John Lockhart.

BRIDGEPORT, CONN.—The Bullard Machine Tool Co. will build a reinforced concrete, 5-story addition to its factory building at Broad street and Railroad avenue.

BRIDGEPORT, CONN. — The Connecticut Breweries Co. will build a brick and steel, 2-story ice plant and a 1-story and basement building at its plant on Housatonic avenue.

BRIDGEPORT, CONN.—Charles M. Ams, president of the Max Ams Machine Co. and the Sterling Automobile Co. has bought the village of Turnerville, which is to be changed to Amstown, and will erect concrete buildings for making automobiles.

HAMDEN, CONN.—Bids will close about Sept. 15 for a brick and stone building to cost $250,000 for the New Haven Orphan Asylum in Whitneyville.

HARTFORD, CONN.—The Whitney Mfg. Co. is about to begin work on the construction of a 4-story, 58 x 112-foot addition to be employed in the manufacture of machinery and driving chains.

NEW BRITAIN, CONN.—The Beaton & Cadwell Mfg. Co. will build a 6-story and basement, 40 x 114-foot addition.

NEW HAVEN, CONN.—The Sperry & Barnes Co. has let a contract for the erection of a 1-story, 75 x 75-foot addition.

ROXBURY, CONN.—Murray & Sorenson, New York, will build a 1-story factory to replace its 50 x 100-foot brass novelty plant which was recently destroyed by fire.

SOUTHINGTON, CONN.—The H. Wales Lines Co., Meriden, has been awarded a contract to erect two mill buildings for the Southington Hardware Co., 1 and 2-stories, 50 x 72 feet and 40 x 144 feet. This company has also been awarded a contract for a brick, 2-story, 78 x 300-foot addition to the plant of the Forsythe Dyeing Co., Whalkey avenue and West Fitch street, New Haven, Conn.

STAMFORD, CONN. — The Lincrusta Works "Pallas" Inc., 121 East Twenty-fourth street, New York, will build a 3-story, 120 x 145-foot plant and a 1-story, 80 x 80-foot power house at Stamford.

WALLINGFORD, CONN.—R. Wallace & Sons have let a contract for the erection of a 2-story factory building.

WATERBURY, CONN. — The American Brass Co. has been granted permits to erect four structures at its plant at Waterbury. They will include a 111 x 203-foot and a 105 x 140-foot factory addition, and two store house additions.

WILLIMANTIC, CONN.—The Smith-Winchester Mfg. Co., South Windham, is about to erect a 2-story machine shop addition.

WILLIMANTIC, CONN.—The Watts Laundry Machine Co. has bought a 300 x 408-foot site and plans to erect a large 1-story addition to its present plant.

From the Alleghenies to the Sea

BINGHAMTON, N. Y.—The Linde Air Products Co., Forty-second Street building, New York, is about to erect a plant at Binghamton.

BROOKLYN, N. Y.—Ira S. Bushey & Sons, Twenty-first street, are about to build a blacksmith shop in connection with their ship yards.

BROOKLYN, N. Y.—Valentine & Co., 456 Fourth avenue have let a contract for the erection of a 5-story, 60 x 80-foot plant addition.

BROOKLYN, N. Y.—The R. H. Comey Co., 78 Eighteenth street, has let a contract for the erection of a large 3-story addition to its plant and for a large boiler house addition.

BUFFALO.—M. Wilde & Co. will build a 3-story, 70 x 100-foot factory building.

BUFFALO.—Peerless Hucker Co. has let a contract for the erection of a 1-story, 85 x 165-foot addition.

BUFFALO.—Buffalo Metal Goods Co. has had plans completed for a 1-story, 40 x 60-foot plant to be erected at 196 Winchester avenue.

CARTHAGE, N. Y. — Carthage Sulphite Pulp & Paper Co. will build a 1-story, 60 x 60-foot machine shop addition.

FARMINGDALE, L. I., N. Y. — Clyde Motor Truck Co., 1474 Broadway, New York, is having plans prepared for a 1-story, 60 x 170-foot plant to be erected at Farmingdale.

FLUSHING, N. Y.—Hunter Car Sign Co. has let a contract for the erection of a 1-story, 85 x 85-foot factory addition.

FLUSHING, L. I., N. Y.—Nathan Mfg. Co., 101 Park avenue, New York, maker of injectors, time fuses, etc., has let a contract for the erection of a plant at Flushing to cost about $500,000.

GROTON, N. Y.—The Corona Typewriter Co. has let a contract for the erection of a 4-story, 50 x 162-foot plant at Groton.

JAMESVILLE, N. Y.—The Thomas Millen Cement Co. has let a contract for rebuilding and enlarging its cement plant.

LACONIA, N. Y.—Scott & Williams, manufacturers of knitting machines, are about to add three stories to their present plant.

LONG ISLAND CITY, L. I., N. Y.—Wm. Higginson, architect, 13 Park Row, New York, has completed plans for a 4-story, 80 x 190-foot factory building to be erected at Long Island City by the Degnon Realty & Terminal Improvement Co. and to be occupied by Marcus Ward & Co., Fifth avenue building, New York.

MANCHESTER, N. Y. — Lehigh Valley railroad shortly will let contracts for the erection of shop buildings at Manchester.

NEW YORK. — Queensborough Gas & Electric Co., 68 Broad street, shortly will let a contract for the erection of a new power plant.

NEW YORK.—Duzets & Son have been incorporated to manufacture electrical machinery and appliances. The new company is capitalized at $50,000 by J. Duzets, F. A. Duzets, 1019 Trinity avenue, and L. J. Davidson, 1125 Boston road, New York City.

NEW YORK.—Fred V. Zobel, architect, 35 West Thirty-ninth street, is preparing plans for the Holland Holding Co., 18 East Forty-first street, for a 12-story, 74 x 90-foot factory and office building to be erected in New York.

NEW YORK.—The Triangle Ventilating Corporation has been incorporated to manufacture

ventilating machinery and appliances. The new concern is capitalized at $50,000 by E. Gallinger, 27 William street, and I. Reiner, 1404 Crotona Park, East.

NEW YORK. — The Universal Carburetor Co. has been incorporated to manufacture carburetors, engines and machinery. The new concern is capitalized at $1,000,000 by John S. Shields, Frederick L. Hurt, New York City, and Elva L. Conroe, Newark, N. J.

NEW YORK.—The Victor Machine & Tool Corporation has been incorporated to do business in engineering and manufacture mechanical and hardware supplies. The new company is capitalized at $50,000 by H. D. Watson, C. F. Cookson and S. D. Paddock, 140 Sterling street, Brooklyn, N. Y.

NEW YORK.—The L. & S. Foundry & Machine Co. has been incorporated to manufacture motors, engines, machines and manufacturers', builders' and mill supplies. The new

70 x 178-foot factory building to cost about $300,000.

SYRACUSE, N. Y.—H. H. Franklin Mfg. Co. has let a contract to W. J. Burns for the erection of a 2-story, 220 x 240-foot plant addition to cost about $250,000.

TROY, N. Y.—The government has appropriated $473,000 for the erection of new buildings and the installation of additional equipment at the West Troy arsenal.

WATERTOWN, N. Y.—The New York Air Brake Co. has let a contract for the erection of a 2-story, 83 x 86-foot, power plant.

WATERVLIET, N. Y.—The government has appropriated $680,000 to be spent for new machinery and improvements to the Watervliet arsenal. Col. W. W. Gibson is in charge.

WILLIAMSBRIDGE, N. Y.—Liberty Lace & Netting Works, Bronxwood avenue and

Co., maker of doors, Westside avenue, will build a 2-story, 90 x 100-foot building to replace that recently burned.

LAMBERTVILLE, N. J.—The Lambertville Rubber Co. will build a 3-story addition.

MAURER, N. J.—The Barber Asphalt Paving Co. contemplates the erection of several new buildings.

NEW BRUNSWICK, N. J.—Ballinger & Perrot, architects, Philadelphia, are preparing plans for a large manufacturing plant to be located at New Brunswick.

PAULSBORO, N. J.—The Vacuum Oil Co., 61 Broadway, New York, will build a 1-story, 100 x 115-foot power plant.

RALEIGH, N. J.—Merck & Co. have let a contract for the erection of a 3-story and basement, 60 x 100-foot addition.

WASHINGTON, N. J.—The Tidewater Pipe Line Co. has purchased a large additional site at Changewater where it already has 14

Business Changes, Consolidations and Expansions

Harper & Son, New York City, dealers in iron and steel products, pig iron and iron ore, for export and domestic consumption, have established offices at 350 Equitable building, 120 Broadway, New York City.

* * *

The Cameron Car Co., Orange, Conn., has filed a certificate showing a change in location to Norwalk, Conn.

* * *

The Excelsior Needle Co., Springfield, Mass., will move its business to the former factory of the Olmsted & Tuttle Co., in Chicopee, Mass.

* * *

The International Nickel Co., Bayonne, N. J., has purchased additional property in Bayonne, having a frontage of 305 feet along the National Docks railroad and 935 feet along the water front. The company has also acquired an adjacent site, 100 x 925 feet.

* * *

The Chester Motor Car Co., Coatesville, Pa., has leased a plant at Cherry and Fifty-eighth streets, Philadelphia, through the Philadelphia chamber of commerce and will immediately move to the new location.

* * *

The Lackawanna Bridge Co., a New York corporation, has qualified to transact business in Indiana. Lawrence B. Davis, Indianapolis, is the representative of the company in Indiana.

* * *

The John Knape Machine Co., Grand Rapids, Mich., has purchased seven lots from the city of Grand Rapids to be used as a site for future expansion.

The Kruse Forgings Co., Chicago, has changed its name to the Atlas Forgings Co.

* * *

The Horne Dale Brown Co., Chicago, has changed its name to the Dale Brewster Machinery Co.

* * *

The Metal Stamping & Mfg. Co., Milwaukee, has changed its name to the Best Register Co.

* * *

The Racine Foundry Co., Racine, Wis., has changed its name to the Simms Foundry Co.

* * *

The Bloomer Machine Works, Bloomer, Wis., has passed into the control of the Eau Claire Mfg. Co., of Eau Claire, Wis.

* * *

The Cutler-Hammer Mfg. Co., Milwaukee, has leased larger offices in New York City. The new offices are on the nineteenth floor of the Hudson Terminal, 50 Church street, and are in charge of W. C. Stevens.

* * *

The Sheboygan Railway & Light Co., Sheboygan, Wis., has changed its name to the Sheboygan Electric Co., having recently passed into the control of the American Public Utilities Co., Grand Rapids, Mich.

* * *

The Brown Instrument Co., Philadelphia, has opened an office in Detroit at 612-613 Chamber of Commerce building, in charge of William Printz, former assistant sales manager.

company is capitalized at $2,000,000 by L. Slater, 909 Jackson avenue; J. L. Sullivan, Marlborough hotel, and G. N. Campbell, 47 West Thirty-fourth street, New York City.

NIAGARA FALLS, N. Y.—The Carborundum Co. has let a contract for the erection of a 4-story, 54 x 166-foot grading and crushing building.

OAKFIELD, N. Y.—Niagara Gypsum Co. will build three 1-story buildings, 100 x 160 40 x 120, and 40 x 80 feet, respectively, to replace the structures recently lost by fire.

ROCHESTER, N. Y.—Alexander Shumway & Utz Co. will build a 4-story, 69 x 69-foot addition.

ROME, N. Y.—Rome Brass & Copper Co. is about to build a 100 x 150-foot, rod mill addition.

ROME, N. Y.—Rome Mfg. Co. has let a contract for the erection of a 1-story, 40 x 156-foot box factory and a 1-story, 40 x 129-foot, annealing building.

SYRACUSE, N. Y.—Will & Baumer have let a contract for the erection of a 3-story,

229th street, will build a 1-story, 50 x 200-foot factory addition.

ELIZABETH, N. J.—The Samuel L. Moore & Sons Corporation is expected to let a contract shortly for the erection of a carpenter shop, power plant and office building.

GLASSBORO, N. J.—The Whitney Glass Works is taking bids on several new buildings, including a 264 x 210-foot factory building and a 94 x 220-foot box and machine shop with a 68 x 187-foot wing.

HARRISON, N. J.—The Driver-Harris Co. has let a contract for the erection of a new annealing house.

HOBOKEN, N. J.—The F. J. Rooney Lamp Co., Fourteenth street and Willow avenue, has let a contract for the erection of a 3-story, 30 x 70-foot addition.

IRVINGTON, N. J.—The Claudius Ash Sons & Co., 1 Union square, New York, has let a contract to the Wm. H. Connolly Co. for erection of a 1-story plant at Irvington to cost about $85,000.

JERSEY CITY, N. J.—The Barnes Mfg.

tanks. The company proposes to erect 10 additional tanks.

WEST ORANGE, N. J.—The Thomas A. Edison Co. has let a contract for the erection of a 2-story and basement, 80 x 220-foot factory building.

ARCADIA, PA.—The International Coupler Co., R. White, president, 435 Wood street, Pittsburgh, has let a contract for the erection of a 1-story, 50 x 175-foot plant at Arcadia.

ARDMORE, PA.—The Autocar Co. will build a 1-story, 80 x 100-foot shop addition.

CHESTER, PA. — Robert Howarth Sons, roofers, have let a contract for the erection of a 1-story, 70 x 110 and 20 x 70-foot plant.

DARBY, PA. — The International Steel Treating Co., 211 North Broad street, Philadelphia, will build a 1-story, 40 x 60-foot plant at Darby.

ERIE, PA.—The Lovell Mfg. Co. will build a 1-story, 35 x 62-foot wire mill.

ERIE, PA.—The Osborn Engineering Co., Cleveland, shortly will take bids on the

structural contract for a 3-story, 50 x 100-foot power plant to be built at Erie for the Hammermill Paper Co.

ERIE, PA.—The American Brake Shoe & Foundry Co. has let a contract for the erection of a 1-story, 75 x 800-foot addition.

GETTYSBURG, PA.—The Gettysburg Furniture Co. will build a 1-story and basement, 60 x 104 and 60 x 250-foot addition.

HAZLETON, PA.—The Lehigh Valley railroad is preparing to erect a repair shop at Hazleton. The company also is preparing to erect similar shops at seven other points along the road.

HOKENDAUQUA, PA.—The National Slag Co. which has crushers at South Bethlehem and Hellertown, is erecting a new crusher at Hokendauqua.

MARCUS HOOK, PA.—The United Roofing & Mfg. Co., Morris building, Philadelphia, has let a contract for the erection of a 1-story, 70 x 450-foot manufacturing building at Marcus Hook.

NEW BRIGHTON, PA.—The Beaver Refrigerator Co. has let a contract for the erection of a 1 and 2-story, 100 x 250-foot manufacturing plant.

PHILADELPHIA.—John E. Spistone & Co., cabinet makers, will build a 4-story plant to replace that recently burned.

PHILADELPHIA.—The Abram Cox Stove Works, American and Dauphin streets, has let a contract for a foundry addition.

PHILADELPHIA.—Revised bids are being taken on a machine shop for the H. B. Pancoast Co., Third and Locust streets.

PHILADELPHIA. — The Tinius Olsen Testing Machine Co., Twelfth and Buttonwood streets, has let a contract for the erection of a 4-story plant addition.

PHILADELPHIA.—The Philadelphia Electric Co. contemplates the erection of a 1-story power plant. The architect is John T. Windrim, Commonwealth building.

PHILADELPHIA. — The Electric Storage Battery Co. has let a contract for the erection of a 1 and 2-story, 100 x 220-foot factory building.

PHILADELPHIA.—Ralph E. White, architect, Pennsylvania building, is preparing plans for a machine shop addition for the Monarch Machine Co., 249 North Third street. A. H. Campbell is the president of the company.

PHILADELPHIA. — The Harrison Bros., manufacturers of paints and chemicals, Thirty-fifth street and Gray's Ferry road, have let a contract to the Samuel Austin & Son Co., Cleveland, for the erection of a 1-story, 100 x 300 foot addition.

PHILADELPHIA.—Plans have been filed by Ballinger & Perrot, architects, for three new buildings to be erected for the Edward G. Budd Mfg. Co., Hunting Park avenue near Wissahickon avenue. The structures will be five stories, 90 x 303 feet, one-story, 91 x 312 feet and one-story, 75 x 334 feet. The company manufactures automobile bodies.

PITTSBURGH. — Dillworth, Porter & Co. have been incorporated to manufacture products from iron and steel. The new company is capitalized at $20,000 by J. D. Beggs, Walter F. Schleiter and Joseph Dillworth, Pittsburgh.

PITTSBURGH.—Wilson & Daum have been incorporated to manufacture electrical and mechanical supplies. The new concern is capitalized at $50,000 by Rowland S. Wilson, Rowland S. Wilson Jr. and John A. Daum, Pittsburgh.

READING, PA.—The Reading Steel Casting Co. will build a 1-story, 60 x 220-foot addition.

READING, PA.—The A. Wilhelm Mfg. Co. has let a contract for the erection of a 1-story, 30 x 296 foot factory building.

WILLIAMSPORT, PA.—The Williamsport Wire Rope Co. has let a contract for the erection of a large addition.

DOVER, DEL.—The Pearson Engine & Machine Co. has been incorporated to manufacture windmills, windmill towers, pumps and air compressors. The company is capitalized at $300,000 by G. V. Reilly, L. H. Gunther and S. A. Anderson, all of New York City.

WILMINGTON, DEL.—The Electric Hose & Rubber Co. will build two large additions, 1-story, 30 x 100 feet, and two stories, 150 x 150 feet, respectively.

BALTIMORE.—The Montgomery Chemical Co., 213 Courtland street, will build a 1-story, 50 x 100-foot factory addition.

BALTIMORE.—The Baltimore Tube Co. has let a contract for the erection of a 1-story, 63 x 351-foot addition to its plant.

HAVRE de GRACE, MD.—Thornton W. Price, architect, Woolworth building, New York, is revising plans for a 1-story, 200 x 400-foot plant to be erected at Havre de Grace for the Maryland Metal Cross Tie Co., Munsey building, Baltimore.

WASHINGTON, D. C.—The Southern Railway Co. is having plans prepared by B. Herman, architect, Munsey building, for a roundhouse, machine shop, store house and other buildings to be erected at Alexandria, Va.

Activities in the Central States

AKRON, O.—The Snider Building Co. has taken out a permit for the erection of a 7-story hotel to cost $80,000 at Broadway and East Market streets. The Erie railroad has applied for a permit to erect freight sheds at Broadway and Exchange streets to cost $50,000.

CANTON, O.—The Canton Metal Ceiling Co., 1940 Harrison avenue, has applied to the city of Canton for land at Harrison and Stanton avenues upon which to erect a large manufacturing plant.

CINCINNATI.—Plans have been completed for a power house for the Springer & Wood Co., St. Louis, to be built on Walnut Hills, Cincinnati, to be used in connection with a skating rink now being built.

CINCINNATI.—The Murray Auto Parts Mfg. Co. has been incorporated to manufacture parts for automobiles. The company is capitalized at $25,000 by William J. Murray, Victor E. Murray, J. H. Muman, S. E. Daugheter and Edwin J. Kennedy.

CINCINNATI.—S. G. Backman & Co., contracting engineers, Cincinnati, have been awarded a contract to erect a garage building, 25 x 100 feet, and a casting house 65 x 150 feet, for the Cincinnati Planer Co. All of the materials and equipment for both buildings have been purchased.

CINCINNATI.—The Cincinnati Ball Crank Co., Oakley, has increased its capital stock from $12,000 to $500,000 to take care of numerous extensions in the business of the company, plans for which will be announced later. It is probable that an addition will be built to the present factory.

CINCINNATI.—The Pfau Mfg. Co., maker of cast iron and enameled plumbers' supplies, will increase its manufacturing facilities by the addition of three new buildings, for which plans are now being prepared. The buildings will be 60 x 350 feet, three stories, 50 x 60 feet, and 40 x 240 feet, one-story, respectively. Bids will be taken for buildings and equipment as soon as the plans are completed.

CINCINNATI.—The new plant of the Union Gas & Electric Co. now in the course of construction, will be one of the largest of its kind in the world. It will be 220 x 300 feet and 196 feet in height and will cost $4,750,000. The company has contracted for boiler equipment, condensers, stokers, steam turbines, generators, switch board, condensing pump, foundations, structural steel, four 309-foot smoke stacks and economizers. This section will have a capacity of 125,000 kilowatts. Contracts will be awarded soon for 162,000-kilowatt equipment.

CLEVELAND.—Plans have been filed with the building inspector by the American Book Binding Co. for the erection of a $35,000 factory at 2231 Carnegie avenue.

CLEVELAND.—Joseph Novogroder plans the erection of a 4-story apartment house to cost $45,000 at Luther avenue and East Fifty-fifth street.

CLEVELAND.—Louis A. Katz has taken out a permit to erect a 2-story, 40 x 122-foot factory at 7229 St. Clair avenue to cost $30,000.

CLEVELAND.—W. C. Owen & Co., architects and engineers, Leader-News building, are preparing plans for a 2-story and basement, 80 x 400-foot factory building for the Big Four Tire & Rubber Co.

CLEVELAND.—The Abbott Corporation of New York, headed by the Hull Bros. Co., Toledo, O., has purchased a 6-acre site on East 152nd street where the company will build a $150,000 factory building for the manufacture of automobiles. The Crowell-Lundoff-Little Co. has the contract for the construction work.

CLEVELAND.—The Sanitary Tinning Co., A. J. Miller, president, is having plans prepared by the C. D. Cooley Co., architect, Century building, Pittsburgh, for a 2-story factory building to cost $50,000.

CLEVELAND.—The Ben Hur Motor Co., Rockefeller building, has purchased over nine acres at Vine street and Morning Glory avenue in Willoughby, O., upon which the company will erect an automobile plant to cost about $300,000. The contract for the first of three buildings comprising the plant has been awarded to the Paul Bros., Citizens building. This building was designed by W. W. Hodges, architect, Schofield building and will cover a site, 150 x 400 feet.

COLUMBUS, O.—The Columbus Forge & Iron Co. has purchased eight acres along the Hocking Valley railroad upon which the company will erect a large factory building. The North Side Lumber Co. has also acquired land on Fifth street upon which it will erect a large plant.

DAYTON, O.—The Metals Machining Co. has been incorporated with a capital of $10,000, to do a general machine shop business. The incorporaters are Charles F. Dye, M. A. Sieg, M. W. Cole, H. M. Haller and G. W. Ozias.

DAYTON, O.—Schenk & Williams, architects, 561 Arcade building, Dayton, have completed plans and are taking bids on the construction of a foundry addition, 40 x 75 feet, for the Computing Scales Co. Schenk & Williams will take bids within 30 days for the erection of a factory building for the Smith

Gas Engine Co. of Louisville, Ky., to cost $120,000.

HAMILTON, O. — The Vail-Rentschler Traction Co. has been incorporated with a capital of $100,000 to manufacture tractor engines of every description. The incorporators are J. A. Vail, G. A. Rentschler, C. B. Wing, Gordon S. Rentschler and Samuel G. Vail. Gordon S. Rentschler and G. A. Rentschler are connected with the Hamilton Foundry & Machine Co. and the Hooven-Owens-Rentschler Co., both of Hamilton.

LORAIN, O.—Plans for the erection of an addition to the plant of the National Stove Co. are under consideration by Thomas J. Rath, superintendent of the company.

MARION, O.—The Power Mfg. Co. has awarded a contract to the Bellefontaine Bridge & Iron Co. for the erection of a plant on Cheney avenue to cost $75,000.

MEDINA, O.—George McNeal, auditor of Medina county, will open bids Sept. 5 for the construction of the superstructure of the Brintnall bridge. The structure will be 28 spans in length with a 24-foot roadway.

SANDUSKY, O. — The Way Cleanse Co., manufacturer of street sweeping machinery, contemplates a large addition to its plant in Sandusky.

SWIFTS, O. — The Vincent Automatic Transmission Co. has been incorporated; with a capital of $10,000 by B. E. Vincent, H. E. Middleswart, B. O. Middleswart, C. C. Middleswart and O. D. McPherson.

TOLEDO, O.—The Bock Bearing Co. is building a plant at Phillips avenue and the Michigan Central railroad. This structure is the first unit of a plant to cover seven acres of land and the building will be 60 x 270 feet, four stories and of reinforced concrete and steel construction. William E. Bock is president of the company.

YOUNGSTOWN, O. — The McKelcey Co. has completed plans for extensive improvements to its present facilities. The plans involve the erection of new buildings on Commerce street, the razing of a building on West Federal street and the erection of a new structure in its place. The estimated cost of the project is $600,000.

ANDERSON, IND.—Plans have been completed for the erection of a 2-story, 50 x 200-foot, reinforced concrete and steel building for the Remy Electric Co. at its plant on Columbus avenue. Schenk & Williams, architects, Dayton, O., prepared the plans.

CONNERSVILLE, IND.—The Lexington-Howard Motor Co. is planning a 1-story addition, 125 x 200 feet.

EVANSVILLE, IND.—The Evansville Band Mill Co. has been incorporated with a capital of $50,000, by F. M. Cutsinger, G. H. Foote and Joseph Waltman. The company will probably be in the market soon for wood working equipment.

INDIANAPOLIS, IND.—F. Schmidt, 3106 Capitol avenue, will build a garage costing $40,000. E. B. Hunter, State Life building, is the architect.

INDIANAPOLIS, IND.—Robert H. Hassler, manufacturer of shock absorbers, will build a factory, 100 x 300 feet, to cost $45,000. The Samuel Austin & Son Co., Cleveland, is the architect.

ABINGTON, ILL.—The Abington Sanitary Mfg. Co. will build a 1-story foundry, 40 x 160 feet. Aldrich & Aldrich, Mall building, Galesburg, Ill., are the architects.

CHICAGO.—The Chicago Electrical Mfg. Co., G. C. Knauff, president, 2817 South Halsted street, will build a 2-story factory, 100 x 133 feet.

CHICAGO.—The Auto Truck Steel Body Co. has been incorporated to manufacture metal bodies for automobiles with $10,000 capital by F. E. Kahl and V. M. Ross.

CHICAGO.—The Central Mfg. District, care John A. Spoor, 38 South Dearborn street, is having plans prepared for a power house and freight tunnels by S. Scott Joy, architect and engineer, 1118 West Thirty-fifth street.

CHICAGO. — The Simpson-Frisch Co. has been incorporated to manufacture ornamental iron work. The company is capitalized at $5,000 by Paul Frisch, T. M. McQuiston and Henry W. Huttman.

CHICAGO.—The Sheet Metal & Conveyor Co. has been incorporated to manufacture conveyors and sheet metal products. The new company is capitalized at $5,000 by Alfred J. Thompson, Georgiana Thompson and Herman E. Kroeplin.

DETROIT.—The Detroit Metallic Casket Co., Arthur Kammer, secretary, 862 Gratiot avenue, will build a 3-story factory, 100 x 130 feet, costing $40,000.

GRAND HAVEN, MICH.—The Alter Motor Car Co., Plymouth, Mich., is planning to erect a factory, 60 x 400 feet, at Grand Haven.

LANSING, MICH.—The Michigan State Fair Association is to install an electric light system. G. W. Dickenson, Pontiac, is the general manager.

PORT HURON, MICH.—The Grand Trunk Railway Co. will build car repair shops at Port Huron to cost $750,000. H. R. Safford, Montreal, is the chief engineer.

MILWAUKEE. — Contracts have been awarded by Herbst & Hufschmidt, architects, for the erection of a brick and steel foundry annex for the Jaeschke Bros. Foundry Co. at Cawker place and the Chicago, Milwaukee & St. Paul railroad, Milwaukee. The steel work has been let to the C. Hennecke Co. and steel sash to the American Steel Window Co.

MILWAUKEE.—The Thos. S. Watson Co., consulting engineer, is preparing specifications for the installation of a pumping engine and air compressor at the municipal waterworks station of Plymouth, Wis. It will have a capacity of 1,500,000 gallons. The same company is preparing plans for remodeling and enlarging the power plant of the Wisconsin Butter & Cheese Co., Elkhorn, Wis.

PEWAUKEE, WIS.—Dr. J. W. Coon has organized the Pen Bryn Sanatorium Co. and will begin work at once on the erection of a $65,000 sanatorium on Pewaukee Lake. Plans by Robert A. Messmer & Bro., Majestic building, call for a 2-story fireproof structure, 70 x 150 feet, with a separate power plant.

SHEBOYGAN, WIS.—The Falls Machinery Co., M. A. Clas, secretary, will build two factory buildings, 120 x 120 and 82 x 85 feet, costing $60,000. Alfred C. Clas, Colby Abbott building, Milwaukee, is the architect.

SHEBOYGAN, WIS.—C. U. Boley, city engineer, is preparing plans for a 600-foot viaduct on South Fourteenth street, to cost not more than $50,000. It will be constructed of steel and reinforced concrete, with a 90-foot steel span, and will be 36 feet wide.

STEVENS POINT, WIS. — The Eureka Grave Marker Association is preparing to build a foundry and finishing shop in Stevens Point. The building will be of fireproof construction, 57 x 75 feet, two stories and basement, and cost about $15,000.

KANSAS CITY.—The Gille Mfg. Co. will build a plant for the manufacture of metal containers.

OVERLAND, MO. — The Grassensbacher Mfg. Co. has been incorporated to manufacture metal specialties with $15,000 capital by A. W. Jaeger and H. E. Grassenbacher.

ST. LOUIS.—The American Water Heater Co., Title Guaranty building, is planning to build a factory costing $12,000.

ST. LOUIS.—The St. Louis Felling Machine Co., Charles L. Knower president, will build a factory to manufacture its machines.

ST. LOUIS.—The Champion Auto Spring Co. has been incorporated to manufacture automobile springs. The company is capitalized at $5,000 by Thomas J. Ryan, J. W. H. Sasse and Walter B. Donnell.

ST. LOUIS. — The Rumsby estate, 310 South Second street, will build and lease to the Emerson Electrical Mfg. Co., L. L. Whittimore secretary, 2030 Washington avenue, a 7-story factory costing $300,000.

DES MOINES, IA.—The Globe Machinery & Supply Co. is planning to build a 6-story factory and warehouse costing $100,000.

HAMILTON, IA.—Bonds for $18,000 will be issued for the construction of a municipal waterworks plant.

MARSHALLTOWN, IA. — The American Machine Products Co. has been incorporated to manufacture automobile parts. The new company is capitalized at $100,000 by E. A. Francis, J. W. Hook, J. Sidney Johnson, H. J. Rogers, and R. W. McCreary.

MISSOURI VALLEY, IA.—Harrison county is planning to build three steel bridges near Missouri Valley at a cost of $70,000.

MT. VERNON, IA.—The Wapsie Power & Light Co. will build 17 miles of transmission lines and a sub-station.

WASHINGTON, IA. — The Iowa Gas & Electric Co. will build 35 miles of transmission lines and five sub-stations.

WATERLOO, IA.—The American Gas & Electric Co., Chicago, has let a contract for the erection of a new power plant at Waterloo.

WATERLOO, IA.—The Bovee Furnace Co. has been incorporated with $75,000 capital to manufacture furnaces. The incorporators are D. W. and A. C. Bovee.

WEST POINT, IA.—A municipal waterworks plant is to be built for which $15,000 in bonds will be issued.

ARGYLE, MINN.—Bonds for $18,500 have been issued for the construction of a waterworks and electric light plant.

DULUTH, MINN.—The Globe Iron Works will construct an iron foundry at its plant on 435 Lake avenue.

DULUTH, MINN.—The Duluth, Missabe & Northern Railroad Co., H. S. Dresser chief engineer, is preparing plans for an ore dock to cost $2,500,000 to replace dock No. 2.

DULUTH, MINN.—The Minorca Iron Co. has been incorporated with $50,000 capital by H. C. Fulton, A. R. Scanlon and M. M. Quinn.

MINNEAPOLIS, MINN.—A. W. Harwood, 216 South Third street, is having plans prepared by Bowler & Bowler, architects, for a 12-story hotel to cost $300,000.

MINNEAPOLIS, MINN.—The Linde Air Products Co., Forty-second street building, New York, will build a 1-story factory, 100 x 100 feet, costing $35,000.

MINNEAPOLIS, MINN.—The Western Crucible Steel Castings Co., 2843 South Grand avenue, has awarded a contract to the Victor Construction Co. for the erection of the first unit of its $250,000 plant to be constructed along the Milwaukee tracks between Pleasant and Grand avenues. The building will be 90 x 180 feet and will contain a 1½-ton Snyder electric furnace.

SAUK CENTER, MINN.—The village of Sauk Center, J. R. Cooper clerk, will build a municipal electric light plant costing $50,000. E. D. Jackson, Capital bank building, St. Paul, is the engineer.

ST. PAUL, MINN.—The Specialty Mfg. Co., manufacturer of lawn mowers, will build a plant costing $20,000. C. L. Kinport, 4017 Essex building, is the architect.

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IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Lower price to Jan. 1, 1917; higher to July 1, 1917.)

Bessemer valley	$21.00
Bessemer, Pittsburgh	21.95
Basic, Pittsburgh	18.95
Basic, eastern Pa.	19.75 to 20.00
Basic, Buffalo	19.00 to 19.50
Malleable, Pittsburgh	19.45
Malleable foundry, Chicago	19.50
Malleable foundry, Philadelphia	21.00 to 21.50
Malleable foundry, Buffalo	18.50 to 19.00
No. 1X foundry, Philadelphia	20.00 to 20.50
No. 2 foundry, Pittsburgh	19.45
No. 2 foundry, Cleveland	18.50 to 19.00
No. 2 foundry, Ironton	18.00 to 19.00
No. 2 foundry, Chicago	19.00
No. 2X foundry, Philadelphia	19.50 to 20.00
No. 2X foundry, N. J. tidewater	19.50 to 20.00
No. 2X foundry, Buffalo	18.50 to 19.00
No. 2 plain, Philadelphia	19.00 to 19.50
No. 2 plain, N. J. tidewater	19.00 to 19.50
No. 2 plain, Buffalo	18.25 to 18.75
No. 2 southern, Birmingham	13.50 to 14.50
No. 2 southern, Cincinnati	16.40 to 17.40
No. 2 southern, Chicago	18.00 to 19.00
No. 2 southern, Phila. delivery	18.50 to 19.50
No. 2 southern, Cleveland	17.50 to 18.00
No. 2 southern, New York docks	18.00 to 18.50
No. 2 southern, Boston docks	17.75 to 18.75
No. 2 south. interior, New Eng.	18.50 to 19.50
No. 2 southern, St. Louis	18.40 to 18.90
Virginia No. 2X, furnace	18.50
Virginia 2X, Philadelphia	21.25
Virginia, No. 2X, Jersey City	21.00
Virginia 2X, Boston points	21.75
Gray forge, eastern Pa.	18.00 to 18.50
Gray forge, Pittsburgh	18.95
Gray forge, Birmingham	12.50 to 13.50
Silveries, 8 per cent, furnace	24.00 to 27.00
Silveries, 8 per cent, Chicago	29.50
Low phos. Standard, Phila.	33.00 to 34.00
Low phos. Lebanon, Pa. furnace	29.00 to 31.00
Low phos. Pittsburgh	30.00 to 31.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	19.75 to 22.25
Charcoal, Buffalo	21.00 to 22.00
Charcoal, Birmingham	22.50 to 23.00

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	4.45
Mesabi Bessemer, 55 per cent, ton	4.20
Old range non-Bess., 51½ per cent, ton	3.70
Mesabi non-Bess., 51½ per cent, ton	3.55

Eastern Ores.
(Per unit delivered eastern Pennsylvania.)

Pt. Henry fur., 60 per cent, unit	8.5c to 8.9c
Local N. Y. and N. J. ores, unit	8.5c to 8.75c
Port Henry lump, at mines, ton.	$4.00

Foreign Ores.
(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent.	nominal
For'n non-Bess., 50 to 65 per cent.	nominal

COKE

(At the ovens.)

Connellsville furnace	$2.75 to 2.85
Connellsville fur., contract	2.40 to 2.50
Connellsville foundry, contract	3.15 to 3.40
Connellsville foundry	3.25 to 3.50
Wise county furnace, contract	2.85 to 3.25
Wise county foundry, contract	3.50 to 3.75
Pocahontas foundry, contract	3.25 to 3.75
Pocahontas furnace, contract	2.85 to 3.25
New River foundry, contract	3.75 to 4.25
New River furnace, contract	3.25 to 3.50

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, seaboard, prompt	$170 to 175
Ferro manganese, 80 per cent, seaboard, contract	175
Spiegel, 20 per cent, fur. early and last half	45.00 to 50.00
Ferro-silicon, 50 per cent, Phil.	83.00 to 85.00
Ferro-silicon, 50 per cent, Pbgh.	83.00 to 85.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $31.00; 10 to 11 per cent, $32.00; 11 to 12 per cent, $33.00; 12 to 13 per cent, $34.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billet, Phila.	$47.50 to 50.00
Forging billets, Phila.	65.00
Forging billets, Pbgh., nominal	65.00 to 70.00
Forging billets, Chicago	65.00
Wire rods, Pittsburgh (nom.)	55.00 to 60.00
Bessemer billets, Youngstown	45.00 to 46.00
Bessemer billets, Pittsburgh	45.00 to 46.00
Open hearth billets, Pittsburgh	45.00 to 46.00
Open hearth billets, Youngstown	45.00 to 46.00
Bess. sheet bars, Youngstown	45.00 to 46.00
Op. h'th sheet bars, Youngstown	45.00 to 46.00
Bess. sheet bars, Pittsburgh	45.00 to 46.00
Open hearth sheet bars, Pbgh.	45.00 to 46.00
Muck bars, Pittsburgh (nominal)	40.00 to 45.00

SKELP

Grooved steel skelp	2.50c to 2.60c
Sheared steel skelp	2.90c to 3.00c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bess. rails, Pbgh. & Chg. delivery after May 1, 1917	$33.00
Stan. op.-h'th rails, Pbg. & Chg. delivery after May 1, 1917	35.00
Light rails, 8 to 10 lbs., Pbgh.	50.00
Light rails, 8 lb., Chicago	43.00
Light rails, 12 to 14 lbs., Pbgh.	49.00
Light rails, 12 lbs., Chicago	42.00
Light rails, 16 to 20 lbs., Pbgh.	48.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York, (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails, 16 to 20 lbs., Chgo.	$41.00
Light rails, 25 to 45 lbs., Pbgh	47.00
Light rails, 25 to 45 lbs., Chgo.	40.00
Relaying rails, standard, Pbgh. and Chicago	$23.00 to 24.00
Relaying rails, light, Chicago	24.00 to 25.00
Angle bars, st. sect., Pbgh. base	2.00c
Angle bars, st. sections, Chgo.	2.00c to 2.50c
Spikes, railroad, Pittsburgh	2.65c to 2.75c
Spikes, railroad, Chicago	2.75c to 2.90c
Track bolts, Pittsburgh	3.25c to 3.50c
Track bolts, Chicago	3.25c to 3.50c
Tie plates, Chicago	50.00 to 55.00

SHAPES, PLATES AND BARS

Structural shapes, Pbgh.	2.50c to 2.60c
Structural shapes, Philadelphia	2.659c to 2.759c
Structural shapes, Chgo.	2.79c to 3.50c
Structural shapes, New York	2.669c to 2.769c
Tank plates, Chgo.	3.19c to 3.60c
Tank plates, Pittsburgh (con.)	2.90c to 3.00c
Tank plates, Pittsburgh	3.50c to 4.00c
Tank plates, Philadelphia	3.159c to 4.159c
Tank plates, New York	3.169c to 4.169c
Bars, soft steel, Chicago	2.79c to 3.50c
Bars, soft steel, Pbgh.	2.50c to 2.60c
Bars, soft steel, New York	2.669c to 2.769c
Bars, soft steel, Philadelphia	2.659c to 2.759c
Hoops, carloads, Pittsburgh	3.00c
Bands, Pittsburgh	2.60c
Shafting, Pbgh., contr. carloads	15 to 20 off
Bar iron, Chgo.	2.35c
Bar iron, Philadelphia	2.559c
Bar iron, Cleveland	2.40c
Bar iron, New York	2.569c
Bar iron, Pittsburgh	2.65c to 2.75c
Hard steel bars, Chgo.	2.50c

SHEETS AND TIN PLATE

(Differentials indicated below are not now being closely followed.)

Bessemer.

BLUE ANNEALED SHEETS PITTSBURGH

	Per lb.
Nos. 3 to 8	2.95c to 3.20c
Nos. 9 to 10 (base)	3.00c to 3.25c
Nos. 11 and 12	3.05c to 3.30c
Nos. 13 and 14	3.10c to 3.35c
Nos. 15 and 16	3.20c to 3.45c

Bessemer.

BOX ANNEALED SHEETS, COLD ROLLED PITTSBURGH

Nos. 17 to 21	2.55c to 2.80c
Nos. 22 and 24	2.60c to 2.85c
Nos. 25 and 26	2.65c to 2.90c
No. 27	2.70c to 2.95c
No. 28 (base)	2.75c to 3.00c
No. 29	2.80c to 3.05c
No. 30	2.90c to 3.15c

Bessemer.

GALVANIZED SHEETS OF BLACK SHEET GAGE, PITTSBURGH

Nos. 10 and 11	3.25c to 3.50c
No. 12	3.35c to 3.60c
Nos. 13 and 14	3.35c to 3.60c
Nos. 15 and 16	3.50c to 3.75c
Nos. 17 to 21	3.65c to 3.90c
Nos. 22 and 24	3.80c to 4.05c
Nos. 25 and 26	3.95c to 4.20c
No. 27	4.10c to 4.35c
No. 28 (base)	4.25c to 4.50c
No. 29	4.45c to 4.70c

No. 28, black, Chicago	3.09c to 3.19c
No. 28 galvanized, Chicago	4.59c
No. 10, blue annealed, Phila.	3.159c to 3.659c
No. 10, blue annealed, Chgo.	3.19c to 3.29c
Tin plate, 100 lb., coke base	$6.00

IRON AND STEEL PIPE

(Prices Adopted July 24, 1916.)

Steel.

Butt weld:—	Black.	Galv.
⅛, ¼ and ⅜ in.	63	35½
½ in.	67	51½
¾ to 3 in.	70	55½
Lap weld:—		
2 in.	65	50½
2½ to 6 in.	68	53½
7 to 12 in.	65	49½
13 and 14 in.	53½	..
15 in.	51	..

Iron.

Butt weld:—	Black.	Galv.
⅛ and ¼ in.	52	24
⅜ in.	53	25
½ in.	57	38
¾ to 1½ in.	60	43
Lap weld:—		
1¼ in.	48	31
1½ in.	54	38
2 in.	55	39
2½ to 4 in.	57	42
4½ to 6 in.	57	42
7 to 12 in.	56	41

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	50 to 52
Iron, 3½ to 4½ inches, l. c. l.	40 to 42

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$2.60
Plain wire, jobbers', Pittsburgh	2.55
Galvanized wire, jobbers', Pbgh.	3.25
Polished staples, Pbgh.	2.75
Galvanized staples, Pbgh.	3.45
Barb wire, painted, jobbers' Pbgh.	2.75
Barb wire, galv., jobbers', Pbgh.	3.45

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ½ x 6 inches, smaller or shorter, rolled thread, 50 and 5, cut threads, 40, 10 and 2½, larger or longer, 35 and 2½.

Machine bolts with hot pressed nuts ½ x 4 inches, smaller or shorter rolled 50, and 10; cut, 50; larger or longer, 40 and 5.

Cold pressed, semi-finished hexagon nuts, 60 and 5.

Gimlet and cone point lag bolts, 50 and 10. Hot pressed square, blank or tapped nuts, $2.70 off list; hot pressed hexagon blank or tapped, $2.70.

Cold pressed square, blank or tapped, $2.40 off; hexagon, blank or tapped, all sizes, $2.80.

RIVETS

Structural rivets, Pbgh	4.00c
Structural rivets, Chgo. delivery	3.50c
Boiler rivets, Pbgh	4.10c
Boiler rivets, Chgo. delivery	3.60c

STEEL SHEET PILING

(Pittsburgh)

Base sizes	2.50c to 2.60c

STANDARD STEEL CHAIN

Chain, ½ inch proof coil	5.00c to 5.50c

COLD ROLLED STRIP STEEL

Base price 6.00c to 6.50c per 100 pounds, hard, coils 1½ inches and wider and by .100 inches and heavier.

Extra for Thickness.

0.100-inch and thicker	Base
0.050 to 0.099	$0.05
0.036 to 0.049	0.20
0.035	0.20
0.031 to 0.034	0.35
0.026 to 0.030	0.45
0.020 to 0.024	0.55
0.025	0.45
0.017 to 0.019	1.35
0.015 to 0.016	1.75
0.013 to 0.014	2.45
0.012	2.80
0.011	3.15
0.010	3.50

Other extras as per card of March 15, 1916.

CAST IRON WATER PIPE

Four-inch, Chicago	$33.50 to 34.00
Six-inch and larger, Chicago	30.50 to 31.00
Six-inch Class B, New York	30.50
Four-inch Class B New York	33.50
Four to six-inch Birmingham	28.00
Six-inch and larger Birmingham	25.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.10c
Steel squares, 2-in. & ov., Cleve.	3.75c
Steel rounds, 2-in. & ov., Cleve.	3.75c
Steel bars, under 2 in., Cleveland	3.25c
Steel bars, Detroit	3.20c to 3.25c
Steel bars, Philadelphia	3.00c to 3.25c
Steel bars, New York	3.25c
Steel bars, St. Louis	3.15c
Steel bars, Cincinnati	3.20c to 3.75c
Steel bars, St. Paul	3.20c
Steel bars, over 2-in., Buffalo	4.20c
Steel bars, Buffalo	3.35c
Iron bars, Chicago	3.10c
Iron bars, Cleveland	3.20c
Iron bars, Detroit	3.20c to 3.25c
Iron bars, St. Louis	3.05c to 3.10c
Iron bars, Cincinnati	3.20c to 3.75c
Iron bars, Philadelphia	3.00c to 3.25c
Iron bars, New York	3.25c
Shapes, Chgo.	3.10c
Shapes, Detroit	3.20c to 3.25c
Shapes, St. Louis	3.15c
Shapes, St. Paul	3.20c
Shapes, New York	3.25c
Shapes, Cleveland	3.25c
Shapes, Philadelphia	3.00c to 3.25c
Shapes, Buffalo	3.35c
Shapes and plates, Cincinnati	3.20c to 3.50c
Plates, Chgo.	3.50c
Plates, Detroit	3.60c to 4.00c
Plates, St. Louis	3.55c
Plates, St. Paul	3.60c
Plates, New York	4.00c
Plates, Cleveland	3.65c
Plates, Philadelphia	4.00c to 4.25c
No. 10 blue anl. sheets, Chgo.	3.40c
No. 10 blue anl. sheets, Cleve.	3.10c to 3.25c
No. 10 blue anl. sheets, Buffalo	3.25c
No. 10 blue anl. sheets, St. L.	3.45c
No. 10 blue anl. sheets, Cinci.	3.40c to 3.50c
No. 10 blue anl. sheets, St. Paul	3.50c
No. 10 blue anl. sheets, Detroit	3.55c
No. 28 black sheets, Chgo.	**3.20c**
No. 28 black sheets, Cleveland	3.00c to 3.10c
No. 28 black sheets, Cinci.	3.25c to 3.40c
No. 28 black sheets, Detroit	3.50c
No. 28 black sheets, St. Louis	3.45c
No. 28 black sheets, St. Paul	3.55c
No. 28 galv. sheets, Chgo.	4.65c to 4.75c
No. 28 galv. sheets, Cleveland	4.40c to 4.75c
No. 28 galv. sheets, Cincinnati	4.50c to 5.00c
No. 28 galv. sheets, Detroit	5.00c
No. 28 galv. sheets, St. Louis	4.75c to 5.00c

Freight Rates, Coke

Connellsville district, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.85
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

Angle bars, iron, Chicago	$18.75 to 19.25
Angle bars, steel, St. Louis	14.25 to 14.50
Arch bars and transoms, Chgo.	20.00 to 20.50
Arch bars and transoms, St. L.	20.50 to 21.00
Boiler plate, cut, No. 1, Chgo.	10.50 to 11.00
Boiler plate, cut, No. 1, St. L.	**7.50 to 8.00**
Boiler punchings, Chicago	13.50 to 14.00
Bundled sheet, Cincinnati	8.00 to 8.50
Busheling, No. 1, Chicago	13.00 to 13.50
Busheling, No. 1, Cincinnati	10.00 to 10.50
Busheling, No. 1, Cleveland	11.00 to 11.50
Busheling, No. 1, St. Louis	13.00 to 13.50
Busheling, No. 2, Chicago	9.00 to 9.50
Cast borings, Chicago	6.00 to 6.50
Cast borings, Cincinnati	4.50 to 5.00
Cast borings, Cleveland	6.00
Cast borings, St. Louis	7.25 to 7.75
Cast, No. 1, Chicago	11.75 to 12.25
Cast, No. 1, Cincinnati	11.50 to 12.00
Cast, No. 1, Cleveland	12.50 to 13.00
Cast, No. 1, St. Louis	11.50 to 12.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Cut forge, Chicago	14.75 to 15.25
Iron axles, St. Louis	27.00 to 28.00
Iron axles, Cleve.	28.00 to 29.00
Knuckles, coup., Chicago	14.50 to 15.00
Knuckles, coup., St. Louis	15.00 to 15.50
Locomotive tires, Chicago	20.50 to 21.00
Locomotive tires, St. Louis	20.00 to 20.50
Machine shop turnings, Chgo.	5.50 to 6.00
Machine shop turnings, Cleve.	5.25 to 5.35
Machine shop turn'gs, Cincinnati	5.00 to 5.50
Machine shop turnings, St. L.	6.50 to 7.00
Malleable agricultural, Chgo.	11.00 to 11.50
Malleable agricultural, St. Louis	10.00 to 10.50
Malleable, Cincinnati	8.25 to 8.75
Malleable railroad, Chicago	11.75 to 12.25
Malleable railroad, St. Louis	11.00 to 11.50
Pipes and flues, Cleveland	11.25 to 11.50
Pipes and flues, Chgo.	11.00 to 11.50
Pipes and flues, St. Louis	11.00 to 11.50
Railroad wrought, No. 1, Chgo.	16.00 to 16.50
Railroad wrought, No. 1, Cleve.	15.00
Railroad wrought, No. 1, St. L.	16.00 to 16.50
Railroad wrought, No. 1, Cinci.	15.00 to 15.50
Railroad wrought, No. 2, Chgo.	14.75 to 15.25
Railroad wrought, No. 2, St. L.	15.00 to 15.50
Shafting, St. Louis	$17.00 to 17.50
Spring, St. Louis	13.50 to 14.00
Springs, Chicago	14.50 to 15.00
Steel car axles, St. Louis	28.00 to 29.00
Steel car axles, Chicago	28.50 to 29.00
Stove plate, Chicago	9.25 to 9.75
Stove plate, Cleveland	10.00
Stove plate, Buffalo	11.00 to 11.50
Stove plate, Cincinnati	8.75 to 9.25
Stove plates, St. Louis	9.00 to 9.50

(Gross tons.)

Axle turnings, Cleveland	$11.00 to 11.25
Busheling, No. 1, Buffalo	13.00 to 13.50
Busheling, No. 1, Pittsburgh	13.00 to 13.50
Busheling, No. 2, Buffalo	11.00 to 11.50
Bundled sheets, Pittsburgh	11.00 to 11.50
Bundled sheets, Cleveland	11.25 to 11.50
Bundled sheets, Buffalo	11.50 to 12.00
Car wheels (iron), Pittsburgh	13.50
Car wheels (steel), Pittsburgh	17.00
Car wheels, Chicago	12.00 to 12.50
Car wheels, eastern Pa.	15.50 to 16.00
Car wheels, Buffalo	13.00 to 13.50
Car wheels, N. Y.	13.50 to 13.75
Car wheels, St. Louis	12.25 to 12.50
Car wheels, Birmingham	10.00 to 10.50
Tram car wheels, B'ham	9.50 to 10.00
Cast borings, New York	7.00 to 7.50
Cast borings, eastern Pa.	9.00 to 9.50
Cast borings, Buffalo	7.50 to 7.75
Cast borings, Pittsburgh	8.00 to 8.50
Cast, No. 1, eastern Pa.	16.00 to 16.50
Cast, No. 1, Pittsburgh	14.25
Cast, No. 1, Birmingham	10.50 to 11.00
Cast, heavy No. 1, N. J. points	16.00 to 16.50
Forge, No. 1, eastern Pa.	12.50 to 13.00
Frogs, switches, guards, St. L.	15.75 to 16.00
Grate bars, Buffalo	11.50 to 12.00
Grate bars, N. J. points	11.25 to 11.50
Heavy axle turnings, Buffalo	**12.00**
Heavy melting steel, Pittsburgh	16.00 to 16.50
Heavy melting steel, Buffalo	15.50 to 16.00
Heavy melting steel, Chgo.	15.00 to 15.50
Heavy melting steel, Cleveland	14.75 to 15.25
Heavy melting steel, Cincinnati	14.50 to 15.00
Heavy melting steel, eastern Pa.	14.75 to 15.00
Heavy melting steel, New York	13.00 to 13.50
Heavy melting steel, St. L.	15.50 to 16.00
Heavy melting steel, B'ham	9.50 to 10.00
Iron rails, Chicago	18.75 to 19.25
Iron rails, Buffalo	18.00 to 18.50
Iron rails, Cincinnati	13.50 to 14.00
Iron rails, St. Louis	18.00 to 18.50
Iron rails, Cleveland	18.00
Iron axles, Pittsburgh	28.00
Iron axles, Cincinnati	20.00 to 20.50
Iron axles, eastern Pa.	27.00 to 28.00
Iron axles, Chicago	28.50 to 29.00
Iron axles, Buffalo	24.00 to 24.50
Low phos. steel, Buffalo	20.00 to 20.50
Low phos. steel, Pittsburgh	20.00 to 20.50
Low phos. steel, eastern Pa.	20.00 to 21.00
Machine shop turnings, Buffalo	6.00 to 6.50
Mch. shop turnings, New York	6.75 to 7.25
Mch. shop turnings, Pittsburgh	7.00 to 7.50
Mch. shop turnings, eastern Pa.	7.25 to 7.75
Malleable railroad, Cleveland	14.25 to 14.50
Malleable railroad, Buffalo	15.00 to 16.00
Malleable railroad, Pittsburgh	14.00
Malleable railroad, eastern Pa.	13.00 to 13.50
R. R. and mch. cast, No. 1 Bfl.	15.50 to 16.00
R. R. wrought, No. 1, Buffalo	17.25 to 17.75
R. R. wrgt., No. 1, eastern Pa.	20.00 to 20.50
R. R. wrgt., No. 1, New York	18.00 to 18.50
R. R. wrought, No. 1, Pbgh.	18.00 to 18.25
R. R. wrought, No. 1, B'ham	9.50 to 10.00
Reroll. rails, 5 ft. & ov., Pbgh.	16.50 to 17.00
Reroll. rails, 5 ft. & ov., Chgo.	16.25 to 16.75
Reroll. rails, 5 ft. & ov., E. P.	17.25 to 17.50
Reroll. rails, 5 ft. & ov., St. L.	16.75 to 17.20
Shafting, New York	20.00 to 20.50
Shafting, eastern Pa.	20.00 to 21.00
Shoveling steel, Chicago	14.50 to 15.00
Shoveling steel, St. Louis	14.50 to 15.00
Steel rails, short, Chicago	15.75 to 16.25
Steel rails, short, Cleveland	18.00
Steel rails, over 6 ft., Cleveland	14.50 to 15.00
Steel rails, old, B'h'm	**10.50 to 11.00**
Steel rails, short, St. Louis	15.75 to 16.00
Steel car axles, Birmingham	21.00 to 22.00
Steel car axles, New York	28.00 to 30.00
Steel car axles, Buffalo	26.00 to 26.50
Steel car axles, Cleveland	32.00
Steel car axles, Pittsburgh	28.00
Steel car axles, eastern Pa.	28.00 to 30.00
Stove plate, N. J. points	12.00 to 12.25
Stove plate, Birmingham	9.00 to 9.50
Stove plate, Pittsburgh	11.00 to 11.25
Stove plate, eastern Pa.	12.00 to 12.50
Wrought pipe, New York	11.00 to 11.50
Wrought pipe, eastern Pa.	13.00 to 13.50
Wrought pipe, Buffalo	12.00 to 12.50

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Prest-O-Lite Co., The, Indianapolis, Ind.

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Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
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Hydraulic Press Mfg. Co., Mt. Gilead, O.
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Wood, R. D., & Co., Philadelphia, Pa.

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ALLOYS.
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Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Steel Co., Canton, O.

ALUMINUM ALLOYS.
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ALUMINUM.
(Granulated.)
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM.
(Solder.)
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM.
(Vanadium.)
American Vanadium Co., Pittsburgh, Pa.

ALUMINUM INGOTS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM RODS.
(Sheet.)
United Smelt'g & Alum. Co., New Haven, Ct.

ANGLES. TEES, CHANNELS.
(See Steel, Structural.)

ANNEALING BOXES AND POTS.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Zanesville Malleable Iron Co., Zanesville, O.

ANTIMONY.
Wah-Chang Mining & Smelting Co., New York City.

ANTIMONY OXIDES.
Wah-Chang Mining & Smelting Co., New York City.

ARMATURES.
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

AXLES.
American Bridge Co., New York City.
Bethlehem Steel Co., So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.

BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BALLS.
(Steel.)
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

BANDS.
(Steel.)
Carnegie Steel Co., Pittsburgh, Pa.

BARGES.
(Steel.)
American Bridge Co., New York City.

BARRELS, TUMBLING.
(Wire Nails.)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BARS—ALLOY.
Central Steel Co., The, Massillon, O.

BARS.
(Concrete Reinforcing.)
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS.
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American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago, Ill
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Steel Co., Canton, O.
Upson Nut Co., Cleveland, O.

BEAMS, CHANNELS AND ANGLES.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

BEARINGS.
(Ball.)
New Departure Mfg. Co., Bristol, Conn.

BEARINGS.
(Vanadium Steel.)
American Vanadium Co., The, Pittsburgh, Pa.

BELLS.
(Marine and Locomotive.)
Vanduzen, E. W., Co., The, Cincinnati, O.

BELT CEMENT AND DRESSING.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.
Williams, I. B., & Sons, Dover, N. H.

BELT LACING.
(Leather.)
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

BELTING.
(Chain.)
Link-Belt Company, Chicago, Ill.

BELTING—LEATHER.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.
Williams, I. B., & Sons, Dover, N. H.

BENCHES.
(Steel.)
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES.
(Drawing.)
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES.
Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

BENZOL RECOVERY PLANTS.
Koppers, H., Co., Pittsburgh, Pa.

BILLETS.
Andrews Steel Co., The, Newport, Ky.
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Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Illinois Steel Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Otis Steel Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
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Youngstown Sheet & Tube Co., Youngstown.

BLAST FURNACE SKIP CARS.
Lakewood Engrg. Co., Cleveland, O.

BLAST FURNACE TUYERES.
Keystone Bronze Co., Pittsburgh, Pa.

BLAST FURNACE VOLUME METERS.
Clark, Chas. J., Chicago, Ill.

BLOCKS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.

BLOOMS.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bourne-Fuller Co., Cleveland, O.
Cambria Steel Co., Philadelphia, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Hillman, J. H., & Sons, Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
La Belle Iron Works, Steubenville, O.
Lackawanna Steel Co., Buffalo, N. Y.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Upson Nut Co., Cleveland, O.
Wood, Alan, Iron & Steel Co., Philadelphia.
Youngstown Sh't & Tube Co., Youngstown, O.

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